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Analyzing the effectiveness of a Dairy Cooperative/The cost of Milk Production

Abstract

Agricultural cooperatives have been a unique way of addressing the concerns of the producers and consumers regarding pricing, storage, marketing, and other such activities of bringing the commodity to the market. One of such sectors is the dairy, where there are cooperatives in both the developed and developing countries. *Amul Dairy*, a milk cooperative in India is, synonymous with quality of its milk and milk products as well as fair prices to both the consumer and producer. In this paper, we examine the effectiveness of *Amul* by comparing the procurement prices offered by the dairy cooperative to the cost of producing milk. We must caution about the conclusions that we draw from this project as the study is conducted in only one village out of the many where *Amul* operates.

Keywords

India, dairy cooperative, milk production

Disciplines

Agribusiness | Business

Analyzing the effectiveness of a Dairy Cooperative/The cost of Milk Production

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Analyzing the Effectiveness of Dairy Cooperative (Amul)

Introduction

Agricultural cooperatives have been a unique way of addressing the concerns of the producers and consumers regarding pricing, storage, marketing, and other such activities of bringing the commodity to the market. One of such sectors is the dairy, where there are cooperatives in both the developed and developing countries. *Amul Dairy*, a milk cooperative in India is, synonymous with quality of its milk and milk products as well as fair prices to both the consumer and producer. In this paper, we examine the effectiveness of *Amul* by comparing the procurement prices offered by the dairy cooperative to the cost of producing milk. We must caution about the conclusions that we draw from this project as the study is conducted in only one village out of the many where *Amul* operates.

Brief History

The Kaira (or Kheda) District Co-operative Milk Producers' Union Limited was founded in 1946. The then Government of Bombay had given Polson Dairy exclusive rights to collect milk from Kaira District to sell to Bombay Milk Scheme. Because the milk producers in the District lacked storage facilities, they walked every day quite a long distance to supply Polson with milk in separate containers. Polson, being the only buyer offered low prices and controlled the amount it would buy. The milk would often sour during the summer and in the winter the farmers would have surplus milk that would go to waste. So a time came when the milk producers sought advice from Sardar Vallabhbhai Patel, a close associate of Mahatma Gandhi. Mr. Patel advised the farmers to go on strike against Polson, form a union and supply directly to Bombay Milk Scheme. The Union was formed under the leadership of Mr. Tribhuvandas Patel, a farmer in Kaira. It flourished under Mr. T. Patel and grew further under Dr. Verghese Kurien, known as the architect of India's White Revolution. The Kaira District Union also gave its milk the brand name *Amul*. After India's independence in 1947, Sardar Vallabhbhai Patel became the Home Minister as well as the Deputy Prime minister of India and the Union has continued to receive support from the Prime Ministers, Presidents and the political elite of India. The Union has prospered due to two other factors, its leadership's central focus on improving the lives of

the milk producers and Gujarat's tradition in fine cattle rearing and breeding that ends up in producing good quality milk in good quantities.

Milk consumption is quite high in India but the demand curve is oriented to the season. In the past, there were price fluctuations undertaken by private players to take advantage of the Indian milk environment. Unlike other milk-producing nations, Indian buffaloes and cows have a flush season (in winter), and lean season (in summer). The demand curve is the opposite, thus prices are depressed when producers are producing the most of milk, and vice versa. However, the union strove to smooth out this difference in prices by converting cow and buffalo milk into milk powder and reconstituting milk from milk powder during the lean months. This allowed the union to have a constant demand for producer's milk. However, a fact must be acknowledged that the Union does provide different prices during the lean and flush season, despite smoothing out the demand. This is due to the fact that private players will offer higher prices in the summer (if the cooperative does not), and in this manner, milk producers will sell to the cooperative in the winter and private players in the summer making the entire operation unsustainable.

The milk cooperative has been able to further absorb additional supply (at least in the beginning years) by producing dairy products such as dry milk powder, butter and ice-cream, which offer higher prices than traditional milk.

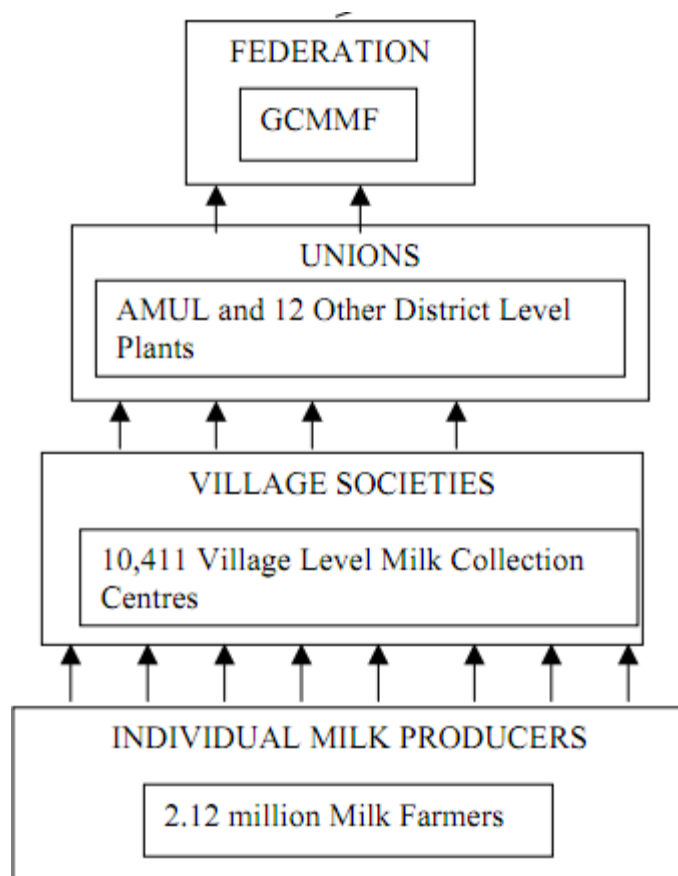
Structure

The Kaira District Union was later followed by milk collection centers and cooperatives set up in other villages and districts of Gujarat. In 1973, all the cooperatives were organized under an apex body the Gujarat Co-operative Milk Marketing Federation Ltd. (GCMMF). *Amul* is the brand name of the milk and milk products that come out of GCMMF. It is a three-tiered system consisting of milk collection centers at the village level, a collection of village collection centers into a cooperative at the district level and the GCMMF at the top. Each district union such as Kaira District Co-operative Milk Producers' Union Ltd sets its own milk prices in the district each year.

The cows and buffaloes give milk twice a day for about 8-9 months and 6-7 respectively. The period, in which they provide milk, is known as the lactation period. The milk producer makes his money from the animal during this period. He collects the milk from the cow or

buffalo, and goes to his local collection center. These local collection centers are in each village (or in a couple of villages grouped together), where the dairy cooperatives' employees measure the amount of milk, % fat, and % SNF. There is a two-tier system in which the amount of money paid to each individual is determined by whether it's cow's or buffalo's milk, and the % fat in the milk. The % SNF does not tend to vary as much, making the % fat the primary factor in determining the price. Although cows produce more milk daily and for a longer period of time, the milk has lower fat content. The cooperative does not prefer one animal over the other, and does has procurement prices accordingly.

Figure 1: Structure of the Kaira District Milk Producers' Union in State of Gujarat



Source: Indian Institute of Management - Ahmedabad

Nature of the Membership

Each member of the union is obligated to sell at least 1 liter (L) of milk daily to the local collection centre to continue the district union's services. In addition, the membership of the union costs a one-time fee of Rs. 60. These services include access to the veterinary doctor, which charge a minimal amount of Rs. 60 per visit (compared to Rs. 300 per visit for a private doctor), and the treatment is of no extra cost. There is no contractual obligation, and each member can potentially sell milk over and above 1 liter to a private dairy. However, as there are no private dairies in the nearby area, that privilege has remained a theoretical one. Most of the milk producers (that we surveyed in the village) keep a portion of the milk for daily consumption, since it is more expensive to buy the milk from Amul's local collection center than cost of producing it. In addition to the veterinary services, members also have access to Amul Dan (nutrition enriched fodder for cows and buffaloes), which allows cows and buffaloes to produce better quality of milk.

Purpose

As the above background suggests, the primary purpose of the Union was to provide fair prices to the milk producers without alienating the consumer. Over the course of several years, the Union has acted against price controls that kept the price of the milk low because that created a disincentive for production. The Union has been successful in increasing the milk production in the district primarily by bringing more milk producers into the union, rather than increasing each individual member's ability to produce more milk (for example, by getting a better breed of cows). The union did attempt to bring higher yielding cross-breed cows from Europe as recommended by outside agencies, but that was unsuccessful since the foreign cattle could not adjust to the local Indian climate as well as the multifunctional role of cows and buffaloes in addition to providing milk. In recent years, Amul has expanded beyond its initial mission and offers services such as fodder, education to members, extension of credit to members, etc.

Procedure

The study was conducted in Navli, a village about ten kilometers away from the town of Anand and Amul's main dairy. The town is in the Kheda district and thus come under the Kaira District Co-operative Milk Producers' Union collection facilities. Anand was chosen for Amul

Dairy primarily due to its accessibility to farmers in the Kheda district. I chose Navli for my fieldwork because it was close to Anand and the milk producers in the village either provided their milk to the cooperative or kept it for their domestic consumption. With the help of two assistants assigned to me, I wrote a questionnaire and conducted a survey in Navli. Over sixty milk producers answered the questionnaire. The questionnaire was in Hindi. Each respondent verbally responded to the questions and the two assistants and I recorded their answers. The assistants were paid for their effort, and before the study was conducted, I explained to them the directions and answered all their questions regarding the survey. We conducted the survey on May 22, 2011 after the milk producers dropped off their milk at the local milk collection center in the morning. In the following section, we discuss the results of the survey and the potential policy implications.

Results

In the results above, we surveyed over 60 milk producers. In order to calculate the amount of milk produced by an animal in a given year, we assumed that the lactation period was equally divided period between the summer and winter seasons. In addition, we assumed that each animal was kept for roughly 15 years, which was reported by some milk producers who had kept multiple animals for a long period of time. Most of the milk producers had not kept an animal for those many years. We annualized the lactation period and the gap between the lactation periods

Although it is not apparent in the results shown above, most of the milk producers had only one or 2 animals. Of the buffalo milk producers, only 3 of them had more than 2 buffaloes, and of the cow milk producers, only 7 of the milk producers had more than 3 cows. There appeared to be no significant advantage (lower costs (ex-labor)) for having a greater amount of cows. Intuitively speaking, the greater number of cows the greater amount of cattle feed and fodder is consumed by the cows resulting in roughly the same (ex-labor costs). However, there is the potential for decreasing the labor costs per liter of milk produced since the cattle rearing time is distributed among greater number of cattle. At the time of the study, the dairy cooperative offered roughly Rs. 16-Rs. 20/L of cow milk and Rs. 24-26/L of buffalo milk. In addition, the dairy cooperative provided an 18% bonus to the farmers based on the amount of milk procured from them. Thus, the effective milk procurement price for cow milk and buffalo milk are Rs. 19-

24/L and Rs. 28-31/L. The profit margin for the milk producers would be between Rs. 4-8.5/L on both cow and buffalo milk. For an average buffalo milk producer who owns 1 or 2 of these animals, it translates to a monthly income of Rs.430-650 and Rs. 867-1300. On the other hand, an average cow milk producer who owns 1 or 2 of these animals, it translates to a monthly income of Rs.470 –1121 and Rs. 953- 2242. As mentioned earlier, it is important to remember that the procurement prices are determined on the quality of the milk (%SNF and % Fat). Thus, any given milk producer could have a significantly higher or lower procurement price depending on the quality of milk his animal is producing. Since the profit margins on the milk produced by either animal are quite similar, one should see a natural tendency of milk producers to move away from buffaloes to cows over a period of time since cows produce a higher quantity of milk.

Table 1: Results of Survey of Milk Producers in Navli, Gujarat

	Buffaloes	Co
Number of Milk Producers surveyed	43.00	25.00
Average Number of Animals	1.77	3.00
Amount of Milk Produced in Summer	4.38	6.34
Amount of Milk Produced in Winter	6.17	8.67
Length of Lactation Period	7.48	7.56
Gap between Lactation Period	5.23	4.84
Total Milk Produced in a year (one animal)	1,109.37	1,682.54
Purchase Price of an Animal	26,315.79	65,673.91
Selling Price of Animal*	3,692.31	1,304.35
% of Milk Producers who keep the animal after it stopped producing milk	77.4%	81.0%
Average Time Animal is Kept**	15.00	15.00
Annual Depreciation Cost of of Animal	1,592.11	3,877.33
Annual Cost of Water	101.49	2,476.15
Annual Cost of Stable Maintenance	1,499.33	852.94
Annual Miscellaneous Costs	41.67	2,281.25
Annual Cost of Fodder	37,059.13	49,003.15
Annual Cost of Cattle Feed	12,853.98	40,478.36
% of Milk Producers with Insurance	18.9%	37.5%
Annual Cost of Insurance	745.00	4,124.38
Annual Cost of Medical Expenses	234.00	358.20
Total Time Spent for Cattle Rearing (Daily)	5.35	8.34
Total Annual Costs (excluding Labor)	50,395.40	89,583.95
Total Labor Costs	24,404.07	38,047.99
Total Annual Costs (including Labor)	74,799.47	127,631.94
Total Amount of Milk	1914.33	5,341.08
Cost of Producing Milk (INR/Liter) (excluding labor)	23.63	15.60
Cost of Producing Milk (INR/Liter) (including labor)	37.43	23.80
All the costs are in INR and averages		
*The number is significantly lower than the purchase price since most of the milk producers keep their animals		
**Only a few people told us that the amount of time they kept an animal		
***The Labor cost was assumed to be Rs. 100/day for 8hour workday or Rs. 12.5/hr as defined by the National Rural Employment Guarantee Act (NREGA)		

Discussion & Possible Policy Implications

The income generated from these dairy activities is considerably lower than offered under NREGA, which is around Rs. 2000/month for an individual. However, it is important to keep in mind that the dairy activities provide a secondary source of income to these households, rather than primary. Since the amount of income generated per animal is not significant, it will be difficult to attract additional private players into the market who can solely focus on milk production and as such it will continue to remain a secondary activity. In addition, it is likely that as the farmer's children and their grandchildren become educated, they will leave farming altogether to enter the educated work force. The milk production is successful since it is entirely a family run operation with the profit compensating them for their time and labor. At current levels of prices, it is difficult for a stable to hire workers to run this operation and make a significant amount of profit. Hence, milk production will continue to rely on families and individuals who are dependent on it as secondary source of income, and are willing to take in lower costs as labor. Given the high food inflation in India, it is not difficult to imagine a scenario where the profit margins are squeezed further unless the price increase is passed on to the consumer. If profit margins are squeezed, then it is possible that farmers and milk producers will either provide the animals with less fodder or that of a lower quality. This could potentially result in a lower quality or lesser quantity of milk produced. Though the dairy cooperative has provided subsidized nutrition enriched fodder, *amuldan*, to farmers, the price of the subsidized fodder may have to increase as well with higher inflation resulting in profit margins squeezed. Thus, the current scenario presents the challenge of not only maintaining the current milk output of the region, but also of increasing it as the population continues to grow.

According to the results of survey, it suggests that there is a significant advantage in purchasing animals that produce a higher quantity of milk regardless of whether it is a cow or buffalo. The amount of time spent for cattle rearing will not change significantly, nor may the cost of resources. However, there are a couple of obstacles in moving to an animal that produces a higher quantity of milk. In many cases, the farmer does not have access to additional financing or the capacity to borrow such amount of capital. Another option is to use artificial insemination into an existing animal to produce offspring, which will provide higher quantities of milk. The government has tried to help in this regard by promoting artificial insemination of foreign breed

cows and buffaloes into the subcontinent's cows and buffaloes. The idea behind this is it is relatively an inexpensive to have an animal that will produce considerably greater amounts of milk than its immediate ancestor. Some scholars have argued that this experiment has not worked as intended. Many of the crossbred animals were unable adjust to the Indian climate. In addition, many of these animals ended producing less milk over the course of their lifetime, and led to a higher cost of maintenance for the farmers. This raises the possibility for the government to try other possibilities, which could include either subsidization of fodder and cattle feed or direct subsidies to farmers. Both of these strategies are designed to increase profit margins for milk producers, so that milk production continues to increase as more farmers and private players consider entering the market.

Government's Response

In the week after the results, we had a chance to discuss the results and the dairy sector at large with the Agricultural Ministry of India. The interview took place with the Agricultural Minister of Government of India, Mr. Sharad Pawar, on June 2, 2011 in Krishi Bhavan in New Delhi, India. The Agricultural Minister, in his prior role as the Chief Minister of Maharashtra, had initiated to support dairy projects across the state. The Agricultural Minister was aware of several issues facing the milk producers across the country. He also stressed the need to increase milk production, and stated that the government was considering a Rs. 1.5 Billion package to promote artificial insemination resulting in crossbred cows with the ability to produce higher quantities of milk. The government website shed additional light on the plan, which will be implemented over a 10 year period and will set up additional facility to develop fodder.

In addition to the higher material costs, the discussion also revolved around the findings from Navli, where milk producers did not make the National Rural Employment Guarantee Act's hourly wage (Rs. 12. 5/hr). The Minister stated that milk production is a secondary source of income, and it allows rest of the household to increase their standard of living. As mentioned in the prior paragraph, he cited his support for increasing the quality of fodder, and increasing the quality of Indian cows through AI program. Generally, the cows from the Indian subcontinent are of considered of lower quality than cows from other parts of the world. He did rule out support for direct subsidies to milk producers as a means of improving the profit margin, and instead focused on AI and increasing access to high quality fodder.

Further Research

In discussing the above results, it is important to keep in mind that the research study was conducted on a very small number of milk producers in a village in Central Gujarat. In order for the data and the study to be more robust, further research should incorporate 10-12 villages in the Kheda district, which is one of the most developed dairy districts in the state, if not the country. It would also be helpful to survey 10-12 villages in a state such as Madhya Pradesh, which does not have such a developed dairy sector. The data would be more robust and precise than a survey of single village. In addition, such a study would enable researchers and policymakers to know whether there are differences in cost of milk production between less and more developed dairy regions of the country.

Conclusion

The AMUL dairy cooperative has accomplished a lot over the years, with increasing milk production and bringing more rural areas under its collection centers. It has also played a pivotal role in increasing India's milk production under the leadership of Dr. Verghese Kurien and Operation Flood. This small survey does not seem to question these facts. The study is merely intended to learn more about the costs of milk production and the income generated through this activity. Though Amul provides a lot of great services to its members including subsidized fodder and veterinary care, the current procurement prices (which are also quite generous) do not result in significant profits for the milk producers. There are many factors that have led to the current scenario, which prompts dairy cooperative executives and the government to consider a series of possible solutions to address the current situation.

Appendix

Figure 2: Translated version (in English) of the survey given to the milk producers

Estimating the Cost of Milk Production Survey

Name: _____

Number: _____

Village: Nawli District: Anand State: Gujarat

1. How many cows/buffaloes do you own?

Buffalo _____ Cow: _____

2. How many liters of milk does your cow/buffalo produce in a day?

Summer: Buffalo _____ Cow: _____; Winter: Buffalo: _____ Cow: _____

3. How many lactations period does a cow/buffalo have in a year?

Buffalo _____ Cow: _____

4. How many lactations period are over a cow's/buffalo's lifetime?

Buffalo _____ Cow: _____

5. What is the purchase value of the cow/buffalo?

Buffalo _____ Cow: _____

6. What is the number of lactations after which you stop milking the cow/buffalo?

Buffalo _____ Cow: _____

7. What do you do with the animal after all its lactation periods are over? Do you sell it or keep it?

Buffalo _____ Cow: _____

8. What is the salvage value of the cow/buffalo? (if you sell it)

Buffalo _____ Cow: _____

9. How much water do you utilize for the particular animal? How much does it cost?

Buffalo _____ Cow: _____

Cost: _____ (per liter, or per animal)

10. What is the cost of maintaining the stable for the entire year?

11. What are the miscellaneous costs such as electricity for the animals for the year?

12. How much fodder goes the animal eats in a day? How much does it cost?

Summer: Buffalo _____ Cow: _____; Winter: Buffalo: _____ Cow:

Cost: _____ (per kg, or per animal)

13. What is the amount of cattle feed for one animal (in a day, yr, etc, or total)? What is the cost?

Summer: Buffalo _____ Cow: _____; Winter: Buffalo: _____ Cow:

Cost: _____ (per kg, or per animal)

14. Do you have any insurance for the animal? Yes or No

15. What is the cost of the insurance premium for each cow/buffalo?

Buffalo _____ Cow: _____

16. What is the cost of veterinary services and how often do you use them?

Cost of Doctor's Visit: _____ Number of doctor's visits in a year: _____

Cost of Pills: _____ Number of pills used in a year: _____

Cost of Hospitalization: _____ Instances of Hospitalization in a year: _____

17. How much time do you spend on cattle-rearing in a day? (includes time making the fodder, milking the cow, and bathing the cow)?

After the end of all lactation periods:

18. How long do you keep the animal after the end of all of its lactations periods?

Buffalo_____ Cow:_____

19. How much time do you spend on the animal after the end of all of its lactations periods?

Buffalo_____ Cow:_____

20. How much fodder do you provide the animal after the end of all its lactations periods? How much does it cost (if different)?

Buffalo_____ Cow:_____

21. How much cattle feed do you provide the animal after the end of its lactation periods? How much does it cost (if different)?

Buffalo_____ Cow:_____

22. What is the amount of veterinary services do you provide for the animal after the end of its lactation periods?

Cost of Doctor's Visit: _____ Number of doctor's visits in a year:

Cost of Pills: _____ Number of pills used in a year:

Cost of Hospitalization: _____ Instances of Hospitalization in a year:

23. How much time do you spend on cattle-rearing when the cow/animal is not producing any milk in the year?

24. Do you continue to buy insurance for the cow after the end of its lactation periods?

Figure 3: Survey given to Milk Producers (in Hindi)

सर्वे / दूध की किमत्त

नाम:

नं:

गांव : नावली, ता. आणंद, गुजरात स्टेट

१: आप की पास कितनी भैंसे ओर गायें हैं ? भैंस गाय

२: कितना लिटर आपकी भैंस ओर गाय दूध देती हैं ?

गरमी : भैंस गाय, शरदी: भैंस गाय

३: आप की भैंस ओर गाय एक साल मे कितनी बार दूध देती (लेक्टेशन समय) हैं ?

गरमी : भैंस गाय

४: गाय ओर भैंस लगातार कितने महीने तक दूध देती है ? (लेक्टेशन समय)

भैंस गाय

५: गाय ओर भैंस की खरीद किमंत कितनी होती है: ?

भैंस गाय

६: जब लेक्टेशन समय खतम हो जाता है तब आप गाय ओर भैं को क्या बेच देंतें हो या तो रखते हो ?

भैंस गाय

७: अगर आप गाय ओर भैंस को बेच देते हो, तो उसकी किमंत क्या है ?

भैंस गाय

८: आपने अपनी गाय / भैंस कितने मे बैची ?

भैंस गाय

९: आप गाय या भैंस पर कितना पानी इस्तेमाल करते हैं (एक दिन) ?

भैंस गाय खर्च

१०: तबेला चलाने का कितना खरचा आता है ?

भैंस गाय

११: आपको गाय पालने से दूसरे कितने खर्च आते हैं ?

भैंस गाय

१२: आपका जानवर एक दिन में कितना फोदर खाता है, और उसकी किमत क्या है?

भैंस गाय खर्च

१३: आपका जानवर एक दिन में और साल में कितना केटल-फिड खाता है ?

और उसका खर्च कितना आता है ?

भैंस गाय खर्च

१४: क्या आपने जानवर के लिए इन्स्योरन्स पोलिसी ली है ? अगर लि है तो

उसका प्रिमियम कितना भरपाई करते हो ?

हां ना खर्च

१५: गाय और भैंस कि देख भाल का कितना खर्च आता है ?

डॉक्टर कि विसीट खर्च डॉक्टर साल में कितनी बार विसीट

पे आता है ?

दवाई खर्च सालाना भर कितना आता है ?

होस्पिटल खर्च सालाना भर कितना आता है ?

१६: आप गाय के पिछे कितना समय बिताते हैं (दूध निकालना, फोदर बनाना या तो खरीददारी करना और स्नान करवाना) ?

समय

१७: जब गाय साल मे दूध न दे तो आप उसके पीछे कितना वक्त निकाल तै है ?
समय

जब गाय और भैंस का दूध देना हमेशा के लिए बंध हो जाये :

१८: आप गाय के पिछे कितना समय बिता ते है (दूध निकालना, फोडर बनाना या तो खरीददारी करना ओर स्नान करवाना) ?

समय

१९: आपका जानवर एक दिन मे कितना फोडर खाता है, ओर उसकी किमत क्या है?

भैंस गाय खर्च

२०: आपका जानवर एक दिन मे ओर साल मे कितना केटल-फिड खाता है ? ओर उसका खर्च कितना आता है ?

भैंस गाय खर्च

२१: गाय ओर भैंस कि देख भाल का कितना खर्च आता है ?

डोक्टर कि विसीट खर्च डोक्टर साल मे कितनी बार विसीट पे आता है ?

दवाई खर्च सालाना भर कितना आता है ?

होस्पिटल खर्च सालाना भर कितना आता है ?

२२: क्या आपने जानवर के लिए इन्स्योरन्स पोलिसी ली है ? अगर लि है तो उसका प्रिमियम कितना भरपाई करते हो ?

हा ना खर्च

२३: आप गाय या भैंस पर कितना पानी इस्तेमाल करते है (एक दिन) ?

भैंस गाय खर्च

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