

# DAIRY ANIMAL PRODUCTIVITY ENHANCEMENT PROGRAM With HERDMAN

**(DAIRY ANIMAL DATA RECORDING SYSTEM)**

**Validated Under projects supported by**

Bombay Veterinary College, Parel, Mumbai 400 012, India  
National Bank for Agricultural and Rural Development, Mumbai  
India Country Development Marketplace-World Bank

Extensively tested at  
Chitale Dairy / Sangamner Milk Union, Maharashtra  
Several Livestock Research Stations of Agricultural Universities  
More than 50 Commercial Dairy Farms  
Recommended In  
Draft Report of the Farmers' Commission of Government of India

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Dairy Animal Productivity Enhancement Need of the Hour

World over dairy animal productivity has increased to many-fold, whereas in India the milk production and fertility have remained more or less static over several decades.

Productivity through planned genetic improvement is more economical than other approaches.

Optimum farmers' resource management ensures continued productivity at affordable cost of production

Many countries have achieved remarkable progress by first setting up animal data recording system.

Such a system permits:

- Ü Improving veterinary, animal husbandry and other services to farmers by optimizing management
- Ü Implementing programs of scientific breeding and genetic improvement
- Ü Detection of underlying problems and their causal association, so scientific solutions are possible

Infonet has developed user-friendly, farmer-centric and India-appropriate computerized animal data recording and analysis system for the dairy industry. The software enables simple, affordable system for data recording with facilities of data analysis report communication to farmers, dairy cooperatives, veterinarians and Milk Unions.

Several networking options available to suit diverse needs of the customers

# Herdman Networking Solutions: Components at the Primary Dairy Farm Unit

## Herdman Modules:

Herdman has been developed in modular form so that in different phases additional modules could be added: The modules are:

1. Core Module including Master entries, Breeding, production, health lifetime records, reports and herd performance analysis

## Salient Features of Herdman:

- The program enables maintaining of lifetime animals records of cow and buffalo.
- The records of cow and buffalo are maintained in the same database, but the data analysis and report generation can be under taken separately.
- The data analysis capability for different breeds of cow and buffalo
- The program can be custom designed for different breeds by defining parameters
- The data can be analyzed as fertility and production indices
- Generates daily action lists for smooth farm / service management
  
- The software is window-based and provides the computing and analysis and networking strength of VB.Net and SQL-Server (Oracle) as database.
- It is icon / menu driven hence even a moderately literate farmer can operate the software without any difficulty.
- The records of all categories of animals, such as, calves, heifers, adults, breeding bulls and working bullocks can be maintained.
- The records of culled, sold or died animals maintained in archive files that can be retrieved easily to analyze the data

## What Data can be maintained?

Following categories of data can be maintained:

- All estrus and AI events with details such as insemination / skip / natural service, sire details for all the parities and the AI technician details. Details of treatment given at the time of AI
- Based on heat synchronization protocols , the program predicts estrus due
- The results of the pregnancy tests / abortion, etc
- Drying off, udder examination report and treatment records at the time of drying-off
- Calving and relevant details.
- Milk records with composition reports
- All sickness events and treatment records
- Feeding details in respect of each animal
- Animal movement records, sold, culled, died, etc.
- Medicine, semen straw, feed and fodder inventory
- Metabolic profiling records

**Multi-level Data Entry:** The animal data can be entered through various levels. It could be external as described in option 1, 2 and 3 or internal. In internal bulk data entry forms for AI, Milk, Calving, Pregnancy tests results have been provided. The software therefore is very easy to handle.

The program can be custom-designed: The program has been provided with facility of fixing the economic and management default values so that the program can installed as per the need of the dairy set up. Thus the program has flexibility of deployment in diverse dairy management set up.

## Core Animal Data Entry, Lifetime Production, Breeding and Health Records Management Module

The screenshot displays the 'Cattle Details' window with a menu bar (New, Save, Edit, Delete, Query, Preview, Print, Close) and a toolbar. On the left, a tree view shows the hierarchy: Animals > MY HERD > Lot new > Milk Shed > Bull Lot > Lot 1 (animals 1-32). The main area is divided into several sections:

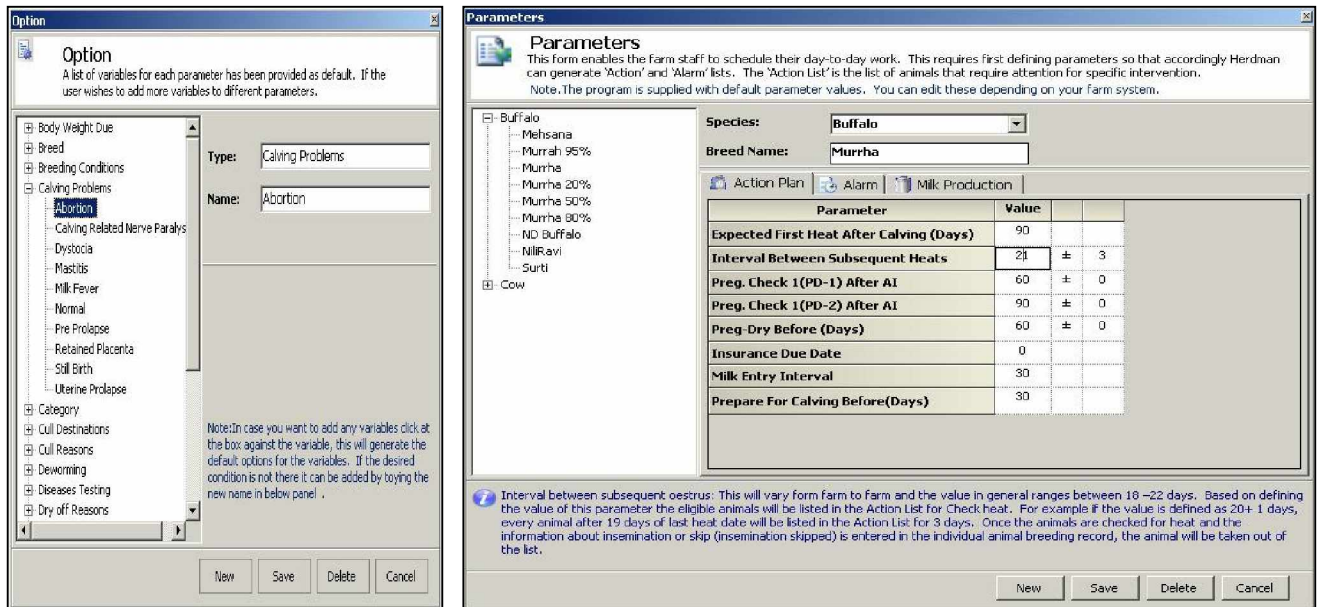
- General:** Herd Name: Milk Shed; Lot Name: Lot 1; Owner Name: Santhosh.P.Naik; ID No: 26; Animal Name: 4 No. chhote thun; Place No: -; Sex: Female; Species: Buffalo; Breed: Murrha; Birth Date: 15/Nov/1992; Birth Wt. (Kg): -.
- Pregnant Milking:** Includes a photo of a cow and a 'Pregnant Milking' status indicator.
- Event Status Table:**

Date	Age	Result	Description
15/Nov/1992	Day 1	General	Birth
27/Nov/2004	12Yrs	NATURAL	raja Sire Used
27/Nov/2004	12Yrs	PREG.	Pregnancy Confirmed
08/Oct/2005	12Yr. 11 M	Calving	Parity =7
02/Jan/2006	13Yr. 2 M	NATURAL	LINKNOWN Sire Used
14/Feb/2006	13Yr. 3 M	NATURAL	manta Sire Used
14/Feb/2006	13Yr. 3 M	PREG.	Pregnancy Confirmed
01/Aug/2006	13Yr. 9 M	Dry Off	Parity =7-Routine
20/Dec/2006	14Yr. 1 M	Calving	Parity =8
07/Mar/2007	14Yr. 4 M	Medical	Diagnosed :-
19/Mar/2007	14Yr. 4 M	NATURAL	tiger Sire Used
19/Mar/2007	14Yr. 4 M	EMPTY	Empty
18/Sep/2007	14Yr. 10 M	NATURAL	Ramu Sire Used
08/Oct/2007	14Yr. 11 M	NATURAL	arjun Sire Used
08/Oct/2007	14Yr. 11 M	PREG.	Pregnancy Confirmed
- Additional Fields:** Purchase Date: 15/11/1998; Rate (Rs.): 0.0000; Purchase Source: hansi.
- Buttons:** Add New Animals, Edit Animal, Remove Animal.
- Reproduction Status:** (indicated by a bull icon)
- Production Status:** (indicated by a cow icon)

The animals can be registered after creating herds and lots. This makes the animal data access easy and the animals can also be maintained in groups of interest.

The 'Master Parameter' menu provides creation of master entries which can be accessed each time an animal is registered. The animal, parent, other details, such as, previous and current parity breeding, production and health records can be entered without any hassle. The missing parity or lactation data does not hamper analysis of the data.

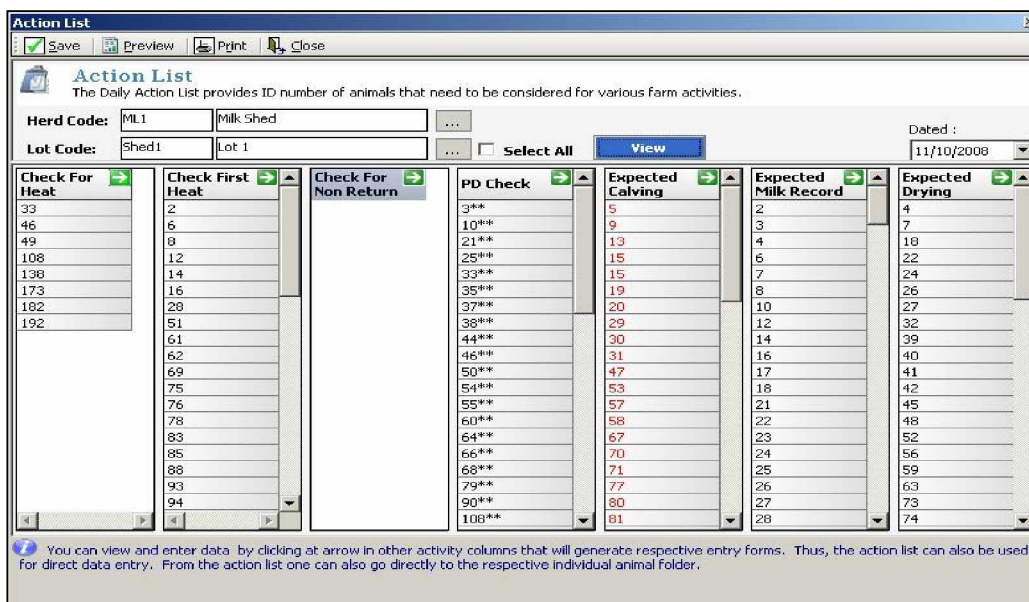
**Custom designing of Herdman:** The software can be custom designed for use in the farm. The Farm manager can define the breeding, production, health targets and action parameters suitable and applicable to the farm.



The parameters can be defined for different breeds of animals. Such a facility is available only in Herdman.

Data entry at multi-level: Multi-level data entry is possible. For example in case there are distinct staff carrying out a particular activity, the data entry is possible from a single form. The animal form can be accessed from many levels.

**Action and Alarm Lists:** Once the animal database is created, daily action and alarm lists can be generated which enables the veterinarian to undertake the management tasks effectively.



**Registers:** Dairy farm operations require maintenance of several registers that would provide information about the animal inventory of the farm and lifetime performance of the animals that entered the farm. Herdman facilitates maintenance of several registers that can provide overall information about the farm animals.

Adult List Report									
Date :-03/11/2007									
Herd Name:-Milking									
Idno	Birth Date	Parity	Status	Sire No	Dam	Dam B.L.Y	Dam B.L.Y (305)	D.F.C	Last A.I
36	25/01/1997	7	Pregnant Dry	-	-	2569	2366	-	17/10/2006
91	10/03/1993	9	Milking	-	-	2505	2056	01/10/2007	05/02/2007
422	25/08/1998	7	Pregnant Milking	-	-	1823	1823	-	14/03/2007
428	25/07/1999	6	Milking	-	-	2181	2128	07/10/2007	14/07/2007
701	02/03/1996	8	Pregnant Milking	-	-	2372	2372	-	27/03/2007
703	03/04/1996	6	Dry	-	-	2510	2493	09/10/2007	17/05/2006
706	06/03/1996	7	Pregnant Dry	-	-	3090	2941	-	24/12/2006
713	15/07/1996	7	Pregnant Milking	-	-	3091	2451	-	12/07/2007
718	18/03/1996	7	Pregnant Dry	-	-	2026	2026	-	06/01/2007
732	20/01/1997	7	Milking	-	-	2800	2262	25/09/2007	18/07/2007
737	02/07/1996	7	Pregnant Dry	-	-	2226	2107	-	20/11/2006
814	18/04/1999	4	Pregnant Dry	-	-	1676	1676	-	01/10/2006
815	20/07/1999	4	Milking	-	-	1925	1925	-	27/09/2007

No of Animals : 13

Bullwise Progeny				
Date :-03/11/2007				
0699 I				
Idno	Dam	Birth Date	Age	Ist Lactation Yield
204	603	14/Feb/2000	7 Yr.9 Mth	2274

No of Animals : 1

AHF-10				
Idno	Dam	Birth Date	Age	Ist Lactation Yield
253	631	30/Oct/2005	2 Yr.1 Mth	-

No of Animals : 1

Apollo				
Idno	Dam	Birth Date	Age	Ist Lactation Yield
755	514	28/Mar/2004	3 Yr.8 Mth	-
436BF	436	09/Aug/2004	3 Yr.3 Mth	-
7BF	7	08/Aug/2004	3 Yr.3 Mth	-
765	7	08/Aug/2004	3 Yr.3 Mth	-
751	65	24/Apr/2004	3 Yr.7 Mth	-
746	120	16/Dec/2003	3 Yr.11 Mth	-
745	61	15/Feb/2004	3 Yr.9 Mth	1095
744	93	25/Nov/2003	4 Yrs	-
742	141	26/Oct/2004	3 Yr.1 Mth	-
741	163	19/Oct/2004	3 Yr.1 Mth	-
770	436	09/Aug/2004	3 Yr.3 Mth	-

No of Animals : 11

Damwise Daughter Register				
Date :-03/11/2007				
102				
Idno	Sire	Birth Date	Age	Ist Lactation Yield
193	SUNDER	01/May/1999	8 Yr.6 Mth	1214.21

No of Animals : 1

108				
Idno	Sire	Birth Date	Age	Ist Lactation Yield
148	JUPITER	07/Mar/2001	6 Yr.8 Mth	1162

No of Animals : 1

**110**

**Reports:** All types of 'Reports' can be generated, which include administrative as well as technical. There is also facility for custom-designing of the reports as per your need.

'Herdman' is capable of generating several reports that are either for the current date or for the desired period. Reports such as, administrative, milk production, breeding, due for calving, semen utilization, heifer, calves, etc., can be generated with a click. Every report also provides a summary report of the herd or lot for various attributes. You can comply the reports to your administrator with just a click of mouse.

A number of technical reports can also be generated. For example, you can generate a report for animals that are to be pregnancy examined.

<b>Details of reproductive problems during the period Jan-2006 to Nov-2007</b>				
Date :-03/11/2007				
<b>June-2006</b>				
<b>Idno</b>	<b>CalvingDate</b>	<b>Reproductive Problem</b>	<b>Abort Days</b>	<b>Abortion Type</b>
783	10/06/2006	PREG.	276	Late Abortion
Count : 1				
<b>July-2006</b>				
<b>Idno</b>	<b>CalvingDate</b>	<b>Reproductive Problem</b>	<b>Abort Days</b>	<b>Abortion Type</b>
319	28/07/2006	PREG.	237	Late Abortion
Count : 1				

<b>Monthly Expected For Calving</b>				
Date :-03/11/2007				
<b>May-2008</b>				
<b>Idno</b>	<b>Heat Date</b>	<b>Expected Date</b>	<b>Days Due</b>	<b>Species</b>
768	30/06/2007	05/05/2008	184	Buffalo
429	12/07/2007	17/05/2008	196	Buffalo
422	22/07/2007	27/05/2008	206	Buffalo
Count : 3				
<b>June-2008</b>				
<b>Idno</b>	<b>Heat Date</b>	<b>Expected Date</b>	<b>Days Due</b>	<b>Species</b>
163	28/07/2007	02/06/2008	212	Buffalo
333	21/08/2007	26/06/2008	236	Buffalo
Count : 2				

## Purchase of Animal during the Period Jan-2006 to Nov-2007

Date :-03/11/2007

### February-2006

Idno	Purchase Date	Cost	Source
799	07/02/2006	0.0000	SHRI. MAHADEO JOSHI, PUNE

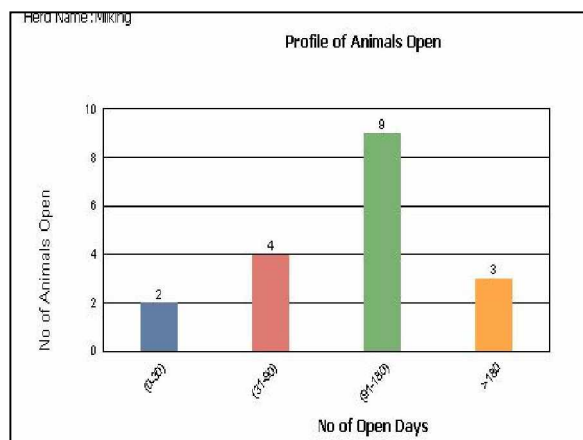
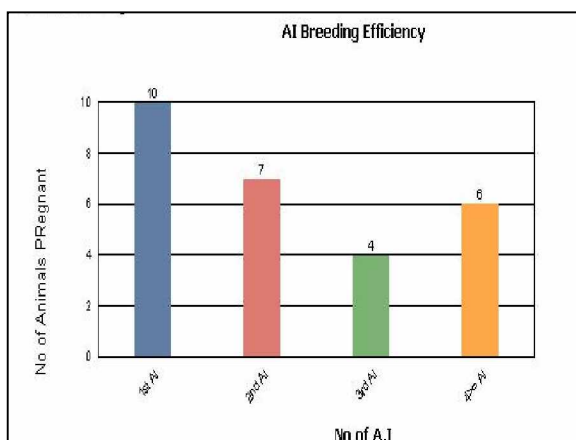
Count : 1

### October-2006

Idno	Purchase Date	Cost	Source
814	12/10/2006	0.0000	BALUBHAI
815	12/10/2006	0.0000	BALUBHAI
816	12/10/2006	0.0000	BALUBHAI

Count : 3

**ANALYSIS:** Herdman is a unique software application in that it not only enables data recording and storage but also provide tools to analyze data to understand the herd performance in the context of health and productivity. In fact it produces a number of analytical reports that will allow the Farm Manager to assess if the management intervention introduced have resulted in positive or negative effects. In this chapter only the details of generating the report is provided. The interpretation of the results is out of scope of this manual and would be provided separately in the technical bulleting. The interpretation information can also be obtained by referring any standard textbook on 'Herd Health and Productivity Management' or 'Herd Medicine' or 'Preventive Medicine'.

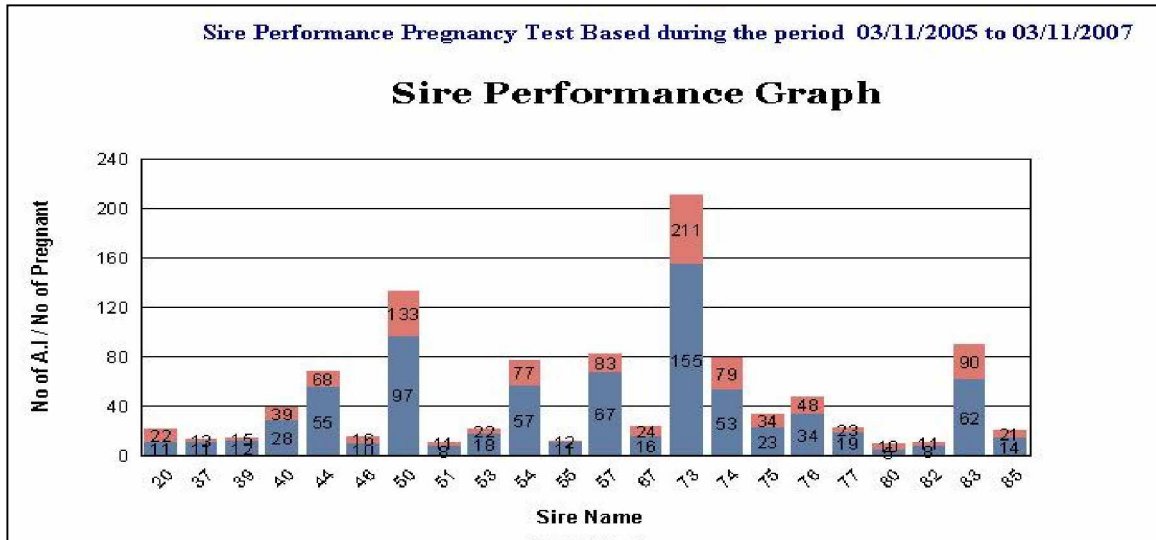


**Semen Straw Inventory Management:** Herdman' also automatically maintains the semen straw or bull records. Very time a straw from a bull is used, the

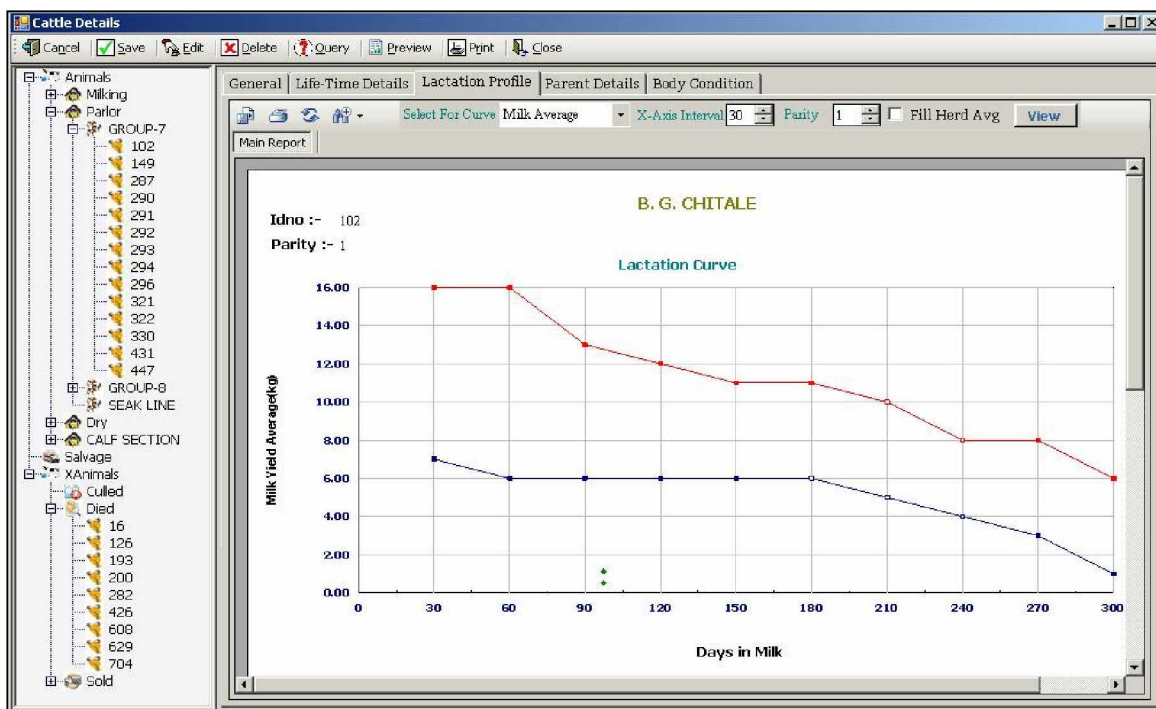


records for straw and the bulls are updated and once the animal is confirmed pregnant, the pregnancy is added in the record of the bull. Herdman also produces the bull performance report for the farm. Consolidation of such report from all the farms / village enables calculation of bull indices.

Thus, the Farm Manager can analyze fertility data and take decision on use of different bulls in the farm.



**Lactation Curve:** the program can generate lactation curve from the milk production data. The curve also depicts other events related to lactation curve such as heat, pregnancy, disease treatment, etc.



**Custom-Designed Report:** provides facility for custom-designing of reports. From amongst more than 180 parameters the veterinarian or manager can select any number of

parameters and generate report of his choice. There is also facility to sort data for various parameters. The unique feature of Herdman is sorting of animals' performance based on its outcome such as economic efficiency of the animal. This enables the manager take decisions

Id No.	Breeding Status	Open Period (Days)	Days in Milk	Peak Yield	Avg. Milk Yield
2	Open Unbred	406	406	9	7.67
3	Open Bred	339	339	9.4	8.36
4	Pregnant	54	454	13	9.05
6	Open Unbred	322	322	11.1	10.45
7	Pregnant	110	506	11	7.81
8	Open Unbred	305	305	13.5	11.92
10	Open Bred	368	368	11.2	9.65
12	Open Unbred	322	322	9.9	9.53
14	Open Unbred	299	299	9.8	6.48
16	Open Unbred	289	289	13.3	9.72
17	Open Unbred	262	506	10.7	7.46
18	Pregnant	73	416	10.5	8.86
21	Open Bred	515	515	12	7.51
22	Pregnant	94	434	9	6.22
23	Open Bred	515	515	12.5	9.68
24	Pregnant	221	491	14.5	8.63
25	Open Bred	447	447	3.7	2.36
26	Pregnant	292	661	12.7	6.88
27	Pregnant	70	435	12	9.61
28	Open Unbred	322	322	10.6	9.72
32	Pregnant	130	455	9.6	8.32
34	Open Bred	614	614	12	7.26
35	Open Bred	411	411	13.3	11.07
37	Open Bred	405	405	13.1	11.44
38	Open Bred	483	483	12	8
39	Pregnant	51	540	15	11.72
40	Pregnant	56	515	12.4	9.38
41	Pregnant	83	489	10	7.59
42	Pregnant	54	374	12.3	11.39
44	Open Bred	342	342	9.5	7.62

based on economic performance of the animal. This also allows selection of animals for breeding purposes.

## Reliable Dairy Farm Ltd

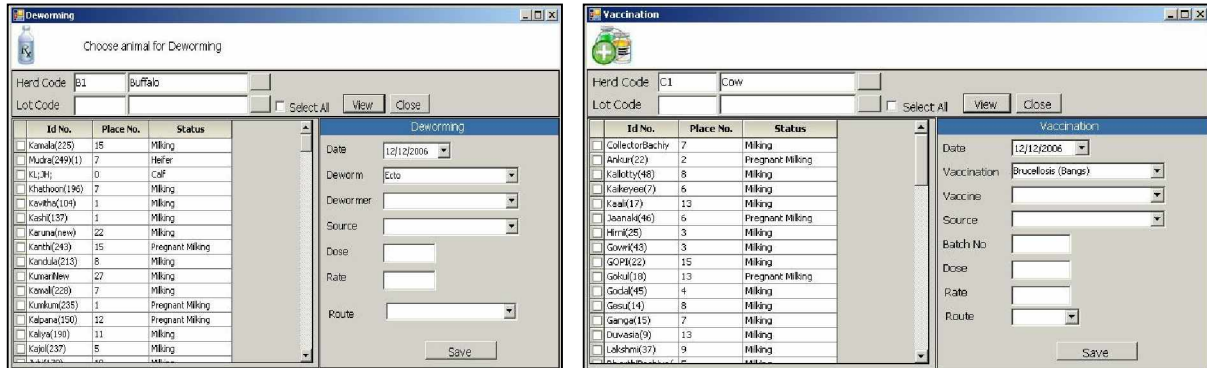
### Report milk yield

Date :-11/10/2008

Status :- Milking

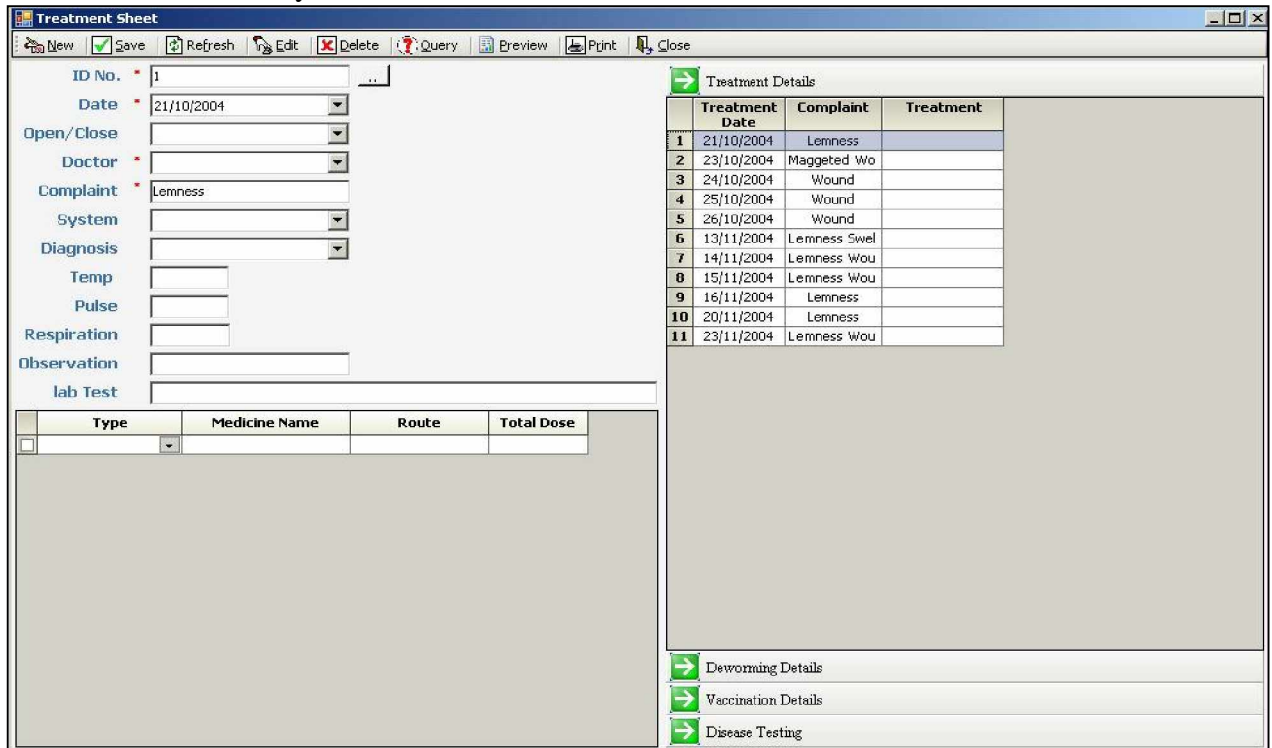
Id No.	Breeding Status	Open Period(Days)	Days in Milk	Peak Yield	Avg. Milk Yield
2	Open Unbred	406	406	9	7.67
3	Open Bred	339	339	9.4	8.36
6	Open Unbred	322	322	11.1	10.45
8	Open Unbred	305	305	13.5	11.92
10	Open Bred	368	368	11.2	9.65
12	Open Unbred	322	322	9.9	9.53
14	Open Unbred	299	299	9.8	6.48
16	Open Unbred	289	289	13.3	9.72
17	Open Unbred	262	506	10.7	7.46
21	Open Bred	515	515	12	7.51
23	Open Bred	515	515	12.5	9.68
25	Open Bred	447	447	3.7	2.36

**Vaccination and Deworming Records:** The records of all vaccination and deworming can be entered as village herds and maintained. The data of production, fertility can be correlated with these parameters.



*De-worming and Vaccination entry forms for the village cooperative herds*

**Sick Animal Case papers and treatment records:** ‘Herdman’ maintains lifetime records of all the treatment carried out in individual animal. The database for different symptoms, systems, and the diseases are in-built so the user has to just select from the combo box. The program also indicates the dose rates for different drugs and the milk withdrawal alarm is also given. The old treatment records can be retrieved with a click. This also enables calculation of true disease rates in the farm. When antibiotics are used, the software also warns the farmers about the residues within the withdrawal period. Many software currently available do not have this facility.



**Herd performance indices:** The ultimate objective of the animal data management is to analyze the data to calculate production, breeding and herd indices to indicate how the herd is performing. Herdman calculates production and reproduction-based herd indices (as mean  $\pm$  Standard deviation) for each lot or herd. This is the unique feature of this software. Herd indices, such as, average milk yield per lactation day, average yield per lactating animal, peak yield, days to peak yield, average lactation length, etc., can be calculated.

## Reproduction

Production And Reproduction Performance

Production Reproduction Performance

Herd Code: H1 Milking

Lot Code:

From: 01/01/2007 To: 31/12/2007  Select All

View Preview Detail Close

Reproduction Production

	Parity(No of Observation) Id No.	Avg. age at Calving (Years)	Avg. Service Period (Days)	Avg. Dry Period (Days)	Avg. Calving Interval (Days)	Avg. Gestation (Days)	Avg. Calving to Conception	Avg. No of A.I./Conception
+	1(20)	2.95±0.25	57.75±3.52	-	-	294.65±5.52	74.6±4.21	1.35±0.18
+	2(14)	3.93±0.36	62.38±5.18	55.54±17.28	462.79±41.98	287.79±6.38	179.5±19.46	3.36±0.68
+	3(17)	5.12±0.19	56±4.66	67.76±12.92	428.82±21.8	295.41±4.17	121±22.57	2.59±0.31
+	4(6)	7±0.63	52.5±9.7	137.67±72.55	457±101.08	301.5±6.57	106±8.08	2.5±0.76
+	5(10)	8.1±0.23	60.88±4.15	106.5±5.55	399.4±10.25	308.3±1.54	95.67±15.22	2.3±0.26
+	6(16)	9.19±0.52	49.8±1.41	94.47±14.17	411.25±13.84	300.75±4.08	85.29±10.95	2.75±0.57
+	7(12)	10.58±0.73	53.33±4.22	102.92±22.47	399.58±30.46	296.33±5.66	62.5±1.84	2.67±0.82
+	8(4)	12.25±1.11	55.5±7.42	71.75±24.5	428.25±39.81	316±7.6	-	2.75±1.18
+	9(2)	13±2	50±5	129.5±7.5	436.5±64.5	299.5±0.5	65	4.5±2.5
	Avg±StdDev(101)	6.24±0.31	55.81±1.51	85.44±7.26	426.09±11.48	296.83±1.97	97.48±5.42	2.46±0.19
	Avg±StdErr(101)	6.24±3.11	55.81±15.18	85.44±72.99	426.09±115.41	296.83±19.78	97.48±54.47	2.46±1.94

## Production

Production And Reproduction Performance

Production Reproduction Performance

Herd Code: H1 Milking

Lot Code:

From: 01/01/2007 To: 31/12/2007  Select All

View Preview Detail Close

Reproduction Production

	Lactation(No of Observation) Id No.	Avg. Lactation Length	Avg. Lactation Yield(kgs)	305-days Milk Yield(kgs)	100-days Milk Yield (kgs)	Avg. Peak Yield(kgs)	Avg. Peak (Days)	Avg. Yield (kgs)
+	1(13)	341.38±19.2	2119.63±239.93	2011.93±233.92	870.18±110.48	11±1.33	50.38±6.99	6.34±0.75
+	2(15)	388.87±45.88	1859.28±171.74	1770.09±158.3	798.35±70.47	10.79±0.86	38±8.57	5.15±0.51
+	3(12)	326.08±27.24	2038.24±175.68	1946.45±131.91	970.01±39.88	15.84±3.89	33.83±6.49	6.34±0.39
+	4(12)	360.42±96.95	1171.17±149.69	1169.06±140.85	614.48±54.17	9.32±0.61	29.58±5.91	4.01±0.46
+	5(17)	318.41±21.43	1829.88±184.96	1719.6±145.48	822.26±48.64	13.46±1.76	54.47±12.58	5.79±0.31
+	6(25)	306.84±22.01	1781.88±160.37	1669.1±139.39	832.22±56.54	62.28±49.54	50.67±10.29	5.59±0.3
+	7(2)	360±103	2355.93±997.62	1998.72±640.43	1015	686.35±671.95	156±94	6.26±0.98
+	8(1)	235	1207.1±0	1207.1±0	689.3±0	10.8±0	24	5.14±0
	Avg±StdDev(97)	339.86±16.09	1814.12±75.83	1721.9±66.71	823.31±27.25	25.64±13.07	44.24±4.02	5.55±0.19
	Avg±StdErr(97)	339.86±158.44	1814.12±746.8	1721.9±656.98	823.31±268.43	25.64±128.76	44.24±39.61	5.55±1.86

The reproduction-related indices that can be calculated are: mean age for first heat in heifers, mean age of calving in heifers, mean days after calving to first heat, mean conception rate, mean A.I. per conception, etc.

The village / block or district level data can also be analyzed for other economic parameters.

The analysis as indices facilitate diagnosis of problems in the herds so that feeding or management or therapeutic intervention decisions can be taken.

Apart from conventional performance indices, the data can also be analyzed for economic indices which are important to plan for cost reduction to help farmers maximize profits.

<b>Well Managed Dairy Farm</b>							
<b>Herd Performance Indices from 01-01-2007 To 30-06-2007</b>							
<b>Reproduction Indices (Adults)</b>							
Avg. Duration Of First Heat After Calving	54±2.11						
Avg. Inter Calving Period	431±1054						
Avg. Calving to Conception Interval	115±13.44						
Avg. Services Interval	25±1.48						
Avg. No Services Per Conception Rate (%)	2.89(37.14%)						
% Animal Negative on PD	25%						
Dystocia %	100%						
L.O.P (% Calving)	100%						
Mortion %	100%						
<b>Animal with Open Period(% Open Animals)</b>				<b>Animal Pregnant (% Pregnant Animals)</b>			
Unbred		Bred		0-70	1-120	>120	
0-70	>70	1-120	>120				
0(0)	9(100)	0(0)	41(100)	22(51.18)	15(34.88)	6(13.98)	
<b>Conception Rate(%)</b>							
1	2	3	>=4	Overall	Conception		
10(38.48)	6(23.08)	4(15.38)	6(23.08)	26	37.14		
<b>Production Indices (Adults)</b>							
Avg. Milk Yield (kg)	1186±117.97						
Avg. Milk Yield (kg) 305 Days	1096±987.4						
Avg. Milk Yield (kg) 100 Days	611±35.07						
Avg. Lactation Days	448±34.1						
Avg. Peak Milk Yield	10±0.32						
Avg. Peak Days	59±9.71						
Avg. Milk Yield Per Day	6±0.31						
Avg. Dry Period	117±8.88						
<b>Sire wise conception rate in adult</b>							
	1	2	3	4	>4	Overall	Conception Rate
<b>Inseminator wise conception rate in adult</b>							
	1	2	3	4	>4	Overall	Conception Rate
MIL PVKUMBHAR	6/7	5/6	4/4	1/1	1/5	17/23	73.91%

*Economic Parameter-based herd performance indices*

**International Compliance:** Herdman has been developed keeping in mind international requirements prescribed by International Committee on Animal Records, Italy.

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