



## *Texas Association of Dairymen*

April 28, 2008

Dr. Melanie Barnes  
Texas Tech University

Dr. Don Ethridge  
Texas Tech University

Re: Summary Crop Use for Dairy Production in Region O

Dear Dr. Barnes and Dr. Ethridge,

Please find the completed projections for dairy cow populations in Region O which Dr. Ellen Jordan and TAD has compiled. I believe the data will provide you with the information based on our survey of dairies in Region O. I will bring several copies of this data with me to the meeting.

I have made plans to join you on May 1<sup>st</sup> in Lubbock. Dr. Jordan, due to prior meetings, will be in Amarillo that day and unable to join the group in Lubbock. If you have any questions for Dr. Jordan prior to the meeting, please let her or myself know, and we will try to address them.

I do appreciate the opportunity to work with your committee and the planning group on these matters.

Sincerely,

John Cowan  
Executive Director  
Texas Association of Dairymen

## Crop Use for Dairy Production in Region O

1. We have completed the projections for cow populations in Region O with either 0, 1 or 3% growth starting in 2020. The most probable scenario based upon historical growth patterns in other states is that growth would continue at the 1% level after 2020, consequently that scenario will be used in the projections which follow. These projections result in 8 counties (Bailey, Castro, Deaf Smith, Hale, Lamb, Lubbock, Parmer, and Terry) in which we actually predict dairy operations will be built. These data were submitted previously to you.
  
2. Based on historical land purchase patterns of the dairies and the predictions, we compiled the average irrigated acreage of corn, sorghum, wheat, and cotton grown in counties using the 1995-2007 NASS databases (cotton is not yet available for 2007, so an 11 year average will be calculated for cotton). We used the planted acres versus the harvested acres, assuming that if the producer planted a crop they thought they had enough water to make a crop. There are a variety of reasons from hail and wind damage to drought to government programs that could have influenced these numbers, however insufficient time and resources to develop a model to factor in all these items was not available.

**Table 1:** Average irrigated acres of total production in Bailey, Castro, Deaf Smith, Hale, Lamb, Lubbock, Parmer, and Terry Counties from 1995 through 2007 compiled from NASS data files for cotton, sorghum, corn and wheat, including the average production per crop. (Alfalfa data was not available from the NASS database.)

Practice	Year	Region O Projected Dairy Counties	Alfalfa	Cotton* Planted All Purposes	Sorghum Planted All Purposes	Corn Planted All Purposes	Wheat Planted All Purposes	Total Acres
Irrigated	1995	8 Co Total		879500	135700	367300	245800	
Irrigated	1996	8 Co Total		876800	185500	418400	255900	
Irrigated	1997	8 Co Total		832700	155700	397900	285100	
Irrigated	1998	8 Co Total		838200	99700	403800	244400	
Irrigated	1999	8 Co Total		965000	193700	264500	253100	
Irrigated	2000	8 Co Total		1051300	105000	261700	296300	
Irrigated	2001	8 Co Total		913500	172900	185700	342500	
Irrigated	2002	8 Co Total		913900	174500	186600	435000	
Irrigated	2003	8 Co Total		942600	364100	189000	393300	
Irrigated	2004	8 Co Total		917400	91600	214000	393500	
Irrigated	2005	8 Co Total		888800	188100	235200	312600	
Irrigated	2006	8 Co Total		812900	107900	225500	343600	
	2007	8 Co Total		NA	251000	348300	379200	
Irrigated	Mean			902716.7	171184.6	284453.8	321561.5	1679917
Irrigated	StDev			65045.42	74120.86	89542.91	64663.34	
	%			54%	10%	17%	19%	

\*Mean, StDev and % were determined based on 11 crop years since 2007 information was not available in NASS database.

3. After determining the average production per crop for the 8 counties, we then utilized the % of each crop grown and used that percentage to determine an average irrigation rate of 14.5 inches of water on the 1,679,917 acres of average annual acres. The water use per acre from the Extension budgets is as follows:
  - Wheat – 15 acre inches
  - Sorghum, grain – 14 acre inches
  - Sorghum, silage – 13 acre inches
  - Cotton – 12 acre inches
  - Corn Silage – 22 acre inches
  - Corn, grain – 22 acre inches
  - Alfalfa – 24 acre inches

Unfortunately the NASS data did not have alfalfa acreage by county, so we can not account for the acreages that were in Region O prior to the influx of dairies for that commodity, therefore the 0 acreage is an underestimate and results in the maximum water utilization possible.

4. Next we calculated the average acre inches required by the crops grown for dairy, using the above Extension budget irrigation rates, as 16.1 inches of water on the acreage used to grow forages for dairy. In general, dairy operations have been sited based on water availability for the crops they have grown so less change in water use may be required than is predicted using this method of estimation. Conversely the dairies do drill additional wells to insure that they can pump sufficient water to grow the forages required for their herds even during periods of low rainfall instead of allowing the land to become “unharvested” cropland.
5. *For more accurate long range planning, additional data should be collected on the requirements to grow silage meeting the nutrient requirements for dairy rations compared to a grain crop. For example when dairies make wheat silage they want to harvest a more immature crop to increase nutritional value and means watering halts in April. The feedlots may look to more mature silage and would continue the watering process further as they are looking for a concentrated source of the fiber from this forage and are obtaining more of their digestible energy from concentrates. Dairies want to have highly digestible forages to obtain some of their digestible energy from the forages as well as it serving as a fiber source. Many feedlot rations will be 10% forage where dairy rations are 40-60% forages; consequently the forage quality requirements are quite different. Thus the Extension irrigation budgets should be re-evaluated to quantify the differences in irrigation requirements for silages grown for dairies relative to crops grown for grain. Our producers estimate that they are using at least 10% less water for their silages than if they would grow that crop to grain harvest.*
6. Once the average acre inches of irrigation needed by the crops required for the forages utilized in dairy cattle rations was calculated, the estimated difference

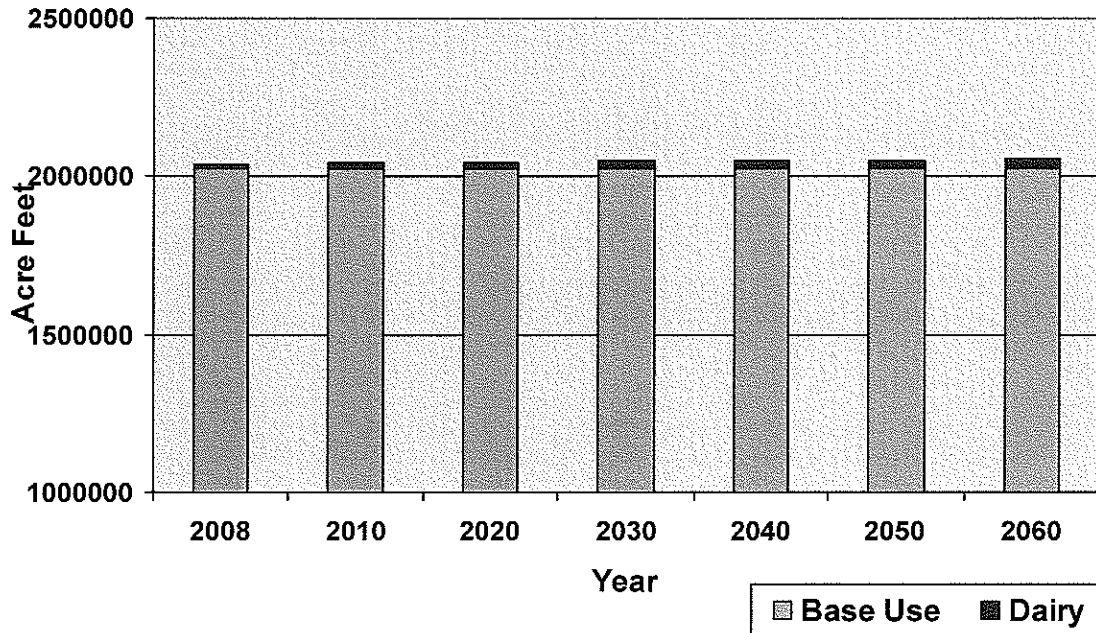
required to grow crops for dairy compared to the traditional pattern of crop production is 1.6 inches. We realize that future crop production patterns may vary significantly from historical trends as crop farmers constantly re-evaluate the economic return potential from the crops that they can grow and alter their plans based on price, water availability, government programs, etc.

**For example:** In 2007, there were nearly 64,000 more acres of corn grown than during the 12 year average, which means nearly 640,000 additional acre inches of water were used than if that acreage had remained in cotton or 512,000 acre inches if it had previously been in sorghum grain production.

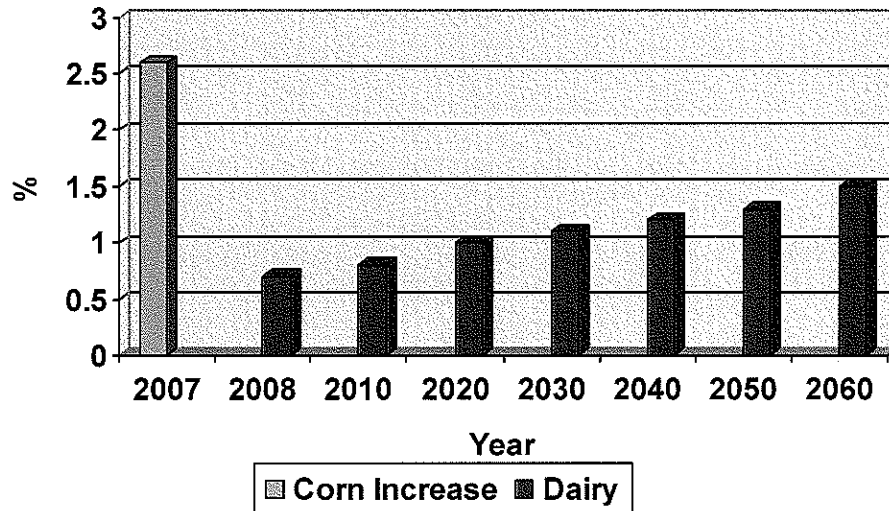
7. Finally how the water use for dairy cropping schemes would vary from that of the traditional cropping pattern was calculated out to 2060. The total number of cows (using the 1% growth rate after 2020) the acreage required to provide forage for these animals (including the heifers associated with them), the total irrigation required to grow those crops, and the irrigation required above traditional cropping patterns is presented in Table 1. Figure 2 represents the increased irrigation required for dairy relative to the average irrigation used for cropping in the 8 county region during the 1995-2008. Finally Figure 3 illustrates how the increased water use calculated for dairy farm forage production may be masked by producer decisions to change cropping patterns for other reasons using the increased water usage for corn grown in 2007 discussed previously as an example.

**Table 1:** Based on 1% growth in the dairy herd after 2020, the total number of crop production acres required to produce the forage needed for dairy as well as the total irrigation water and the difference in water required above traditional cropping patterns.

Year	Total Cows	Acres for Dairy	Total Irrigation		Above Traditional Cropping Pattern	
			Acre In	Acre Feet	Acre In	Acre Feet
2008	130,498	113,533	1,827,885	152,324	170,300	14,192
2010	155,750	135,503	2,181,590	181,799	203,254	16,938
2020	188,544	164,033	2,640,936	220,078	246,050	20,504
2030	208,270	181,195	2,917,238	243,103	271,792	22,649
2040	230,060	200,152	3,222,450	268,538	300,228	25,019
2050	254,129	221,092	3,559,585	296,632	331,638	27,637
2060	280,716	244,223	3,931,989	327,666	366,334	30,528



**Figure 1:** Total acre feet of water use if average crop production from 1995 to 2007 is maintained with the inclusion of water for dairy at the 1% growth rate after 2020.



**Figure 2:** Comparison of the % of water use for the additional irrigation water required by crops grown for dairy relative to the water use of the average crop acreage from 1995-2007 and in comparison to the additional water used on the 64,000 corn acres harvested in 2007 compared to the average annual production, if the acres were switched from cotton production.

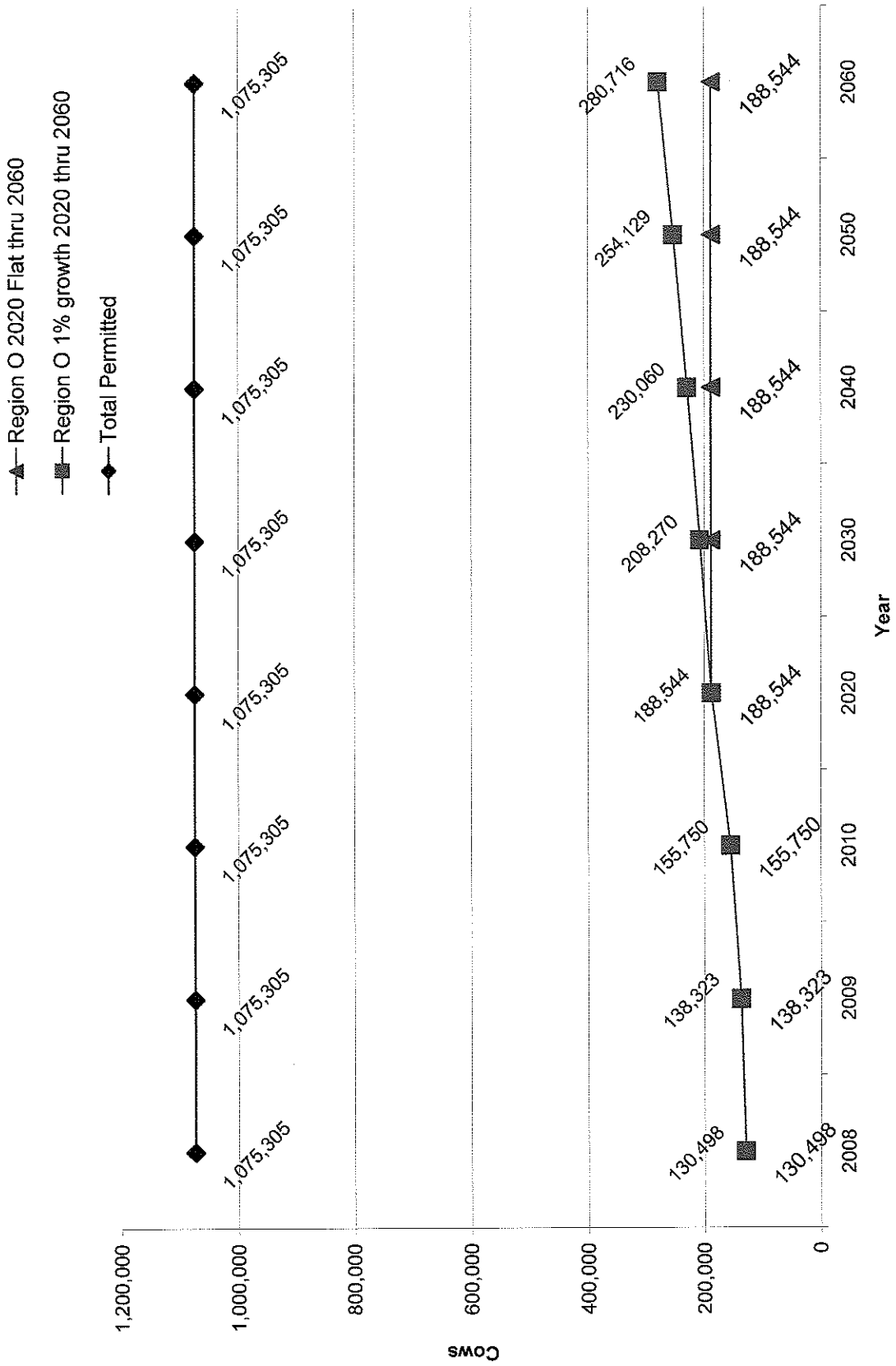
8. We have provided this data on the 8 county basis, not by individual county since this is a regional plan and some of these crops are bought and sold across county lines. By aggregating the counties, the differences in the water use patterns within the various counties are accounted for and the way the water use changes for the region was predicted.

Region O Dairy Farm / Cows Projections of TAD

County	Projected Growth of Dairy Farms / Cows Region O High Plains Texas																	
	2,008		2,009		2,010		2,020		2,030		2,040		2,050		2060			
	Feb 08 Farms	Feb 08 Cows	Farms	Cows	Farms	Cows	Farms	Cows	Farms	Cows	Farms	Cows	Farms	Cows	Farms	Cows		
O BAILEY	9	15,218	10	18,000	11	24,700	13	32,120	14	35,480	16	39,193	18	43,293	19	47,822		
O BRISCO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
O CASTRO	10	23,082	11	26,000	11	27,450	14	35,700	15	39,435	17	43,561	19	48,118	21	53,152		
O COCHRAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
O DEAF SMITH	13	26,800	13	26,800	14	29,000	18	34,000	20	37,557	22	41,486	24	45,827	27	50,621		
O FLOYD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
O HALE	5	13,531	6	15,900	6	15,900	7	17,850	8	19,718	9	21,780	9	24,059	10	26,576		
O HOCKLEY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
O LAMB	9	17,876	10	20,000	11	24,000	13	26,000	14	28,720	16	31,725	18	35,044	19	38,710		
O LUBBOCK*	1	1,500	1	1,553	1	1,600	1	2,089	2	2,308	2	2,549	2	2,816	2	3,110		
O PARMER	13	30,491	14	28,000	15	31,000	19	38,000	21	41,976	23	46,367	26	51,218	28	56,577		
O SWISHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
O TERRY*	1	2,000	1	2,070	1	2,100	1	2,785	2	3,076	2	3,398	2	3,754	2	4,146		
Total Reg O	61	130,498	65	138,323	70	155,750	87	188,544	96	208,270	106	230,060	117	254,129	129	280,716		

TAD data April 2008, resource data supplied from Federal Milk Market and Industry Cooperative Marketing Analysis

# High Plains Dairy Cows



# High Plains Dairy Farms

- Region O Flat Growth 2020 2060
- ▲ Region O Growth 1% thru 2060
- ◆ Permitted Farms

