

# MANAGEMENT

Spring 2009



  
**Sustainable Conservation**  
 Because the Environment is Everyone's Business

## Introducing the Nutrient Management Newsletter

Welcome to the first edition of the Nutrient Management newsletter. Sustainable Conservation produces this newsletter in collaboration with the University of California Cooperative Extension, Natural Resources Conservation Service and the dairy industry.

The purpose of this quarterly newsletter is to offer information to dairy producers and others managing on-farm nutrients. Several economic and environmental benefits can be associated with appropriately timed delivery of nutrients to cropland. Some of these benefits

include the potential for better crop yields; decreased commercial fertilizer use, protecting water supplies and helping California farms remain profitable during difficult economic and regulatory times.

This publication will primarily be focused on producer success stories with dairy nutrient management, record keeping, monitoring and the timely distribution of liquid and solid manure to agricultural fields.

We hope that it serves to facilitate “producers learning from producers” and assists dairies with both improved environmental stewardship and continued compliance with the Water Board’s Waste Discharge Requirements (WDR) for dairy facilities.

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## Q&A with De Groot Dairies

De Groot Dairies is a family operation owned by Tony and Rochelle De Groot and Tony and Betty De Groot in Hanford, Calif. De Groot Dairies has been in business for more than 40 years and milk 4,500-cows and farm more than 2,000 acres. “Our children have aspirations to be involved in agriculture so we are striving to be the best we can be for our children and our environment,” says

Tony De Groot.

**Q.** What operational differences do you see between your parents and your family today?

**A.** Operational differences are mostly about regulations for air and water. In the past the focus was on having the highest production that you could to bring the highest

*Q&A continued on pg 2*



**Tony & Rochelle De Groot Family**

## Environmental Quality Incentive Program

### 2009 Environmental Quality

Incentives Program (EQIP) funding is \$30 million in California and provides payments up to 75 percent (up to 90 percent in certain cases) of the estimated cost of conservation projects. Nutrient management projects and other qualified project that handles, stores, treats and delivers manure are eligible.

Some of these projects include but are not limited to pipelines, flow meters, tail water return systems, solid liquid separators, concrete pads for feed and manure, and rain gutters - to divert rain/fresh water from storage lagoons.

Producers can sign up at any time.

Please contact your local Natural Resources Conservation Service office for applications deadlines, more details about the program and any other projects that may be eligible.

## Best Management Practices Nutrient Management Challenge Program

Are you unsure if you can meet the water board's 1.4 nutrient application limit without sacrificing yields? Are finances making it difficult to justify paying a consultant to keep your records? The Best Management Practices (BMP) Nutrient Management Challenge Program might be just what you're looking for. Participation in this program will help farmers

- Develop a customized nitrogen budget using a powerful crop growth and mineralization model to help you meet the 1.4 maximum nitrogen application requirement using the materials you have available.
- Teach you and your staff how to read and use your flow meter, record data, and calculate nutrient applications as they occur. This can be done by hand with worksheets, or using a computer with simple spreadsheets.
- Use the nitrogen budget developed by this program on up to 50 acres. If the field does not meet the yields of a comparable field, the difference will be reimbursed.

## Funding Opportunities

This yield guarantee program started in 1998 and has been used by farmers in 7 Midwest and Mid-Atlantic states. The University of California Cooperative Extension, in partnership with UC Conservation Tillage Work Group, Sustainable Conservation, American Farmland Trust, and AgFlex have brought this popular program to California.

Participation is limited to Merced, Stanislaus and San Joaquin Counties for the 2009 crop year. Space is limited; please contact Marsha Campbell Mathews or Jennifer Heguy at (209) 525-6800 if you are interested in learning more about this program. All information is confidential. ☛

*Q&A continued from pg 2*

return. Now our focus is on renewable energy, how to manage our manure, water and air regulations, etc. We need to be stewards of our land and be mindful of environment while still trying to operate a viable business.

**Q.** When it comes to the new waste discharge regulations, how much do you do in-house versus what you contract out to your consultant(s)?

**A.** Using our own labor is the most cost efficient way to meet the regulatory issues. We do all of the sample collecting for the wells and crops. We have [flow] meters on all of our wells and we monitor all our fresh and nutrient dairy water. Our ranch foreman reads these meters daily making notes knowing exactly where our water and nutrients are going.

We use consultants to make sure we have all the details complete so we do not miss anything. We also use them in areas that require their expertise, for example the water board requires us to have an engineer sign off on the reporting due in July.

**Q.** What improvements have you made on your operation that allows you to manage your nutrients? (i.e. adding meters, pipelines, tail water return systems, etc.)

**A.** Using the EQIP program, we have added some pipelines from our lagoon to various areas of the ranch. We can pump into stand pipes and properly mix lagoon water with fresh water. They have also helped us put meters on lagoon pumps and fresh water wells as well as distribution lines.

**Q.** What changes have you made to

your management practices? (i.e. record keeping on irrigations, lagoon water distribution, etc.)

**A.** We have more meetings with our irrigators now that we log every field's irrigation, we can show our irrigators the importance and cost per acre of good water control. The cost issues come up in different areas, but this has made us better operators. So the changes include increased record keeping. Finding the right balance for your ground is important for fertilizers and amendments. We have always had a proactive routine of soil and crop sampling in order to optimize our crop yields while managing our input costs. Crop rotations have always played a huge role in our lagoon management. Due to our proactive approach in the past we have found that only a few changes were necessary in our operation.

*Q&A continued on pg 4*

# Flowmeters for dairy nutrient management

By Marsha Campbell Mathews, Farm Advisor, University of California Cooperative Extension

Do you need to install a flow meter? The RB5 waste discharge permit doesn't mandate that one be installed. However, it does require that the volume of each application to each field be recorded and reported and limits the amount of total nitrogen that can be applied. Using pump output and run time will provide an estimate of the amount of lagoon water that went on a field but the pump output will vary considerably depending on the pond level and the thickness of the solids. More importantly, this method only allows the operator to determine what has already been applied to the field. Maintaining yields when the amount of nitrogen that can be applied is limited requires that the operator plan ahead of time how much lagoon water to apply and be able to apply that exact amount. An in-line flow meter and throttling valve on the pond outlet is by far the easiest method of measuring and regulating nutrient application when using pond water nutrients.

Most flow meters will display both the current flow rate (gpm) and the totalized flow (gallons, hundred gallons, or thousand gallons). With the starting and ending total flow (gallons) and the nitrogen concentration obtained from a lab or a quick test, the total amount of nutrients applied to the field can easily be calculated. If both a flow meter and a control valve are installed, specific nitrogen application rates can be targeted. To target an application rate, the concentration of lagoon water nitrogen is determined and the length of time for the irrigation is estimated. Then a chart or spreadsheet is consulted which gives the target flow rate for the desired nitrogen application rate. The valve on the lagoon outflow is adjusted until the flow meter readout displays the targeted flow rate. The flow meter is checked periodically during the

irrigation to ensure that the desired application rate is maintained.

For this system to work properly, it is essential that the right kind of flow meter is installed and that it is installed correctly. There are many types of flow meters available but only a few can be used for dairy lagoon water because of the presence of debris and solids which clog or foul the mechanisms. Only flow meters commonly used for sewage, pulp, or other similar applications are appropriate for use with lagoon water. Since most of these applications are in controlled industrial settings, it has been our experience that even these flow meters require some modifications before they work properly in the harsh outdoor environment on

Central Valley



*Jim Wyeth adjusts a flow meter on his operation.*

dairies. Be sure the meter you select has a history of dairy use and has a good warranty backed by an established company with excellent customer service.

Only electromagnetic meters have consistently worked well in dairy applications. There are two basic styles of electromagnetic meters: tube style, which replaces a section of pipe, and insertion meters, which go in through the pipe wall

and protrude a short way into the pipe. Insertion meters measure the velocity of the water at a single point in the pipe and adjust this value to assume the velocity in the whole cross section of the pipe. They can easily be removed from the pipe for secure storage when not in use. They can also be used on a variety of pipe diameters if the meter must be moved to another location or if the pipe size is very large or may change at some point in the future. Tube style meters bolt into the pipe and require no calibration before use. Both styles provide sufficient accuracy for dairy applications.

Correct placement of the flow meter is critical to obtaining accurate flow readings. For a flow meter to perform properly it must be placed on a section of pipe that is always completely full. One way to make sure the pipe is always full is to provide a section of pipe downstream from the meter where the pipeline is at least 1 pipe diameter higher than the pipe where the sensor is located. Sometimes this can be as simple as installing the meter in a section of vertical pipe but often a metering run must be constructed which will provide the conditions the meter needs. Insertion style meters also require placement on a straight section of pipe that is at least 5 pipe diameters upstream and 10 pipe diameters downstream from an elbow or tee. A pipe with a 12-inch diameter would need 15-feet of straight run. Flow meters need to be placed even further away from active valves, which distort the flow pattern more severely than elbows. While tube style meters benefit from placement in a metering run, the length of straight pipe required will often be less if the meter is designed to measure the flow across the entire cross section of the pipe.

Look for a meter that has the option of supporting a simple data logger. It's easy to make errors when copying long strings of numbers off the display. ☞

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**Q.** What financial assistance did you take advantage of to try to decrease these expenses?

**A.** NRCS has many different programs for people to take advantage of. Including the EQIP program. EQIP programs will assist by way of engineering to funding in areas of pipelines, tail water systems, land leveling, manure separators, lagoons and lagoon liners, dust control, consultant and engineer costs. It's best to contact your local NRCS to find out more details.

**Q.** How have your employees responsibilities changed and how has that affected your business?

**A.** For some of the work, we have no option but to hire consultants and engineers to have the required work completed. It has been a very costly venture and we only hope that we can recoup those costs. As far as our own employees, we have given new job descriptions to our management and added labor to fill the voids created. As owners, we work closely with the consultants to make sure that everything is completed to the protocol given to us.

**Q.** Has this improved your overall farming system? (i.e. purchasing less commercial fertilizer since managing your lagoon water more closely?)

**A.** The short answer would be yes and no. No, because we have always been on the cutting edge of things and have strived to do the best we could in our farming operation. Yes because now everything is recorded and we can show our employees the areas that we need to improve on or give praise for the areas that are going well. Both answers come at a big cost, and for us, we question how all the regulations are being used by those implementing them and if some of these costs could be streamlined. For example, we took 120 samples of alfalfa to the lab for test last year. All the samples had nearly the same information for a huge cost to us and now are filed away. We do not see this as improving our operation. While we know all the new regulations are a learning curve for all the regulatory agencies and for us as farmers, we hope to continue working together and use all the latest information to benefit everyone. Our motto is: If we take care of our industry and the land, it will take care of us. ☺

## How much lagoon nitrogen did you apply to each field?

Simple worksheets to hand-calculate the amount of nitrogen, phosphorus and potassium you applied to each field last season are available for download at [manure.ucdavis.edu](http://manure.ucdavis.edu) under the topic "Tracking Nutrient Applications." Two forms of the worksheet are provided. One uses flow meter totalizer readings (thousand gallons) and a separate worksheet uses pump output in gallons per minute and run time.

You will also need a laboratory analysis of your lagoon water to complete the calculations.

If you are making multiple applications of liquid manure to each field, it's easy to maintain a running total of the amount of nutrients applied if you use a different worksheet for each field and enter the data as you get it. Excel spreadsheet versions of these simple calculation forms are also available for download. ☺

## Summary of Important Mailings/Notifications

By California Dairy Quality Assurance Program

### To-Do List of July 1, 2009 Deliverables

#### Submit to RB5 by deadline:

- Annual Report, including annual dairy facility assessment
- Spreadsheet available at: <https://www.co.merced.ca.us/EnvironmentalHealthWM/>
- Documentation of completion of Interim Facility Modifications for Storage Capacity and to Balance Nitrogen (Tab 6.6)\*

#### NMP

- Statement of Completion (Tab 6.9)\*
  - Land Application Area Information (map) (keep on farm)
  - Nutrient Budget with CNMS signature (keep on farm)
- Retrofitting Plan with Schedule
- Salinity report (Certification of salt reduction in dairy waste)

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### TO-DO LIST: WDR GENERAL ORDER ON-GOING ACTIVITIES Spring 2009

#### CONTINUE TO DO NOW & TURN IN WITH NEXT YEAR'S ANNUAL REPORT:

- Process Wastewater Written Agreements – Update as needed (Tab 6.4)\*
- Manure Tracking Manifests (Tab 6; GO Appendix D)\*
- Storm Water and Discharge Monitoring (MRP Table 3; Tabs 8.1, 8.2, 6.15)\*
- Source Well/Tile Drain Sampling (annually) (MRP-Table 4; Tab 5.1)\*
- Nutrient analysis for soil, harvested plant material, solid & liquid manures and irrigation water (Tab 5.2-5.6)\*
- Application record-keeping for each field (Tabs 1.7 and 6.2, 6.11-6.14)\*

#### CONTINUE DOING NOW & MAINTAIN ON-FARM:

- ✓ On-farm monitoring & sampling:
  - Production Area & Land Application Area Visual Monitoring (including pond photos) (MRP-Table 1; Tab 6.1 and 6.2)\*
  - Operation and Maintenance Plan Record Keeping (Form Tab 6)\*

\*= Refers to tabs of the CDQAP WDR Reference Binder