

# **Pajaro Valley Nutrient Management Education & Outreach Project**

**FREP Contract # 99-0764**

## **Project Leaders**

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## **Cooperators**

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## **Objectives**

1. To introduce information to growers on more efficient and cost-saving alternatives in nutrient/water management by dissemination of information through different media.
2. To create an opportunity for local growers to meet with farm advisors, university scientists, industry representatives, the FREP scientists, and to exchange experience, practical knowledge, and new technologies for nutrient and water management by conducting seminars/workshops
3. To recognize agricultural and non-agricultural communities' efforts in project area water quality protection, prevention, and improvement by organization and conducting of a water quality awareness faire.

4. To allow growers to see scientific, cost-saving, and environmentally friendly methods of on-farm nutrient, water and soil erosion control management by performing field demonstrations by the UCCE farm advisors, scientists, and researchers; fertilizer industry field agents; and growers who have used nutrient and water management practices successfully.
5. To curtail on-farm excess nutrients together with soils transported to the water bodies by the surface runoff by promoting NRCS technical and USDA cost-sharing programs.
6. To provide on-farm technical assistance to growers/operators who are willing to try but do not have time, or not eager to spend any additional expenses for the trial.
  - (i) To help determine the level of nitrate in the irrigation well water.
  - (ii) To monitor nitrate levels in water in domestic wells located in the areas surrounded or nearby the farms by giving free service to well owners in testing nitrate in their well water.

### **Summary**

It was quite an experience for the Pajaro Valley cooperators to work intensively on this project. For a nice surprise, Monterey County Agricultural Commissioner's Office (MCACO) gave tremendous support and assistance as a cooperator although not listed in the list above. The goal of this project is to gain high level of local growers and farmers' participation at all events under this project. The weather, demand for intensive attention needed for growers during farming season, and (Spanish) languish barrier were major challenges in the effort to achieving the goal. A workshop on Irrigation and Fertilization (held at UCCE Auditorium in Watsonville) was completed with a good turnout in January 2000, however, due to the contracting delays, this event was not considered as part of the contract. As a result, the events under this contract officially began in March 2000. In fact, the timing was somewhat late for the project actions. Due to the previous year's poor (financial) returns, the growers had already anxiously engaged in their farm operations. While other organizations' other outreach efforts made during that period were experiencing with poor to no attendance, the turnout at a field demonstration on Nitrate Quick Test in March 2000 under this project was relatively good (about 20). Based on this experience, all activities previously scheduled in the late spring and early summer were rescheduled to fall and winter. Three more workshops were conducted. The plan for "Water Quality Awareness Day Faire" was expanded by including an Agricultural Expo, and held in October 2000. Over 40 exhibitors from private and public sectors participated. In addition to MCACO, the California Strawberry Commission and Santa Cruz County Farm Bureau provided assistance in attracting the growers' participation.

In addition to the release of announcements, distribution of flyers, Internet web publications, and personal contacts to growers, the regional media (newspapers, TV and radio stations) also assisted the project by getting the word out about the events under the Public Service Assistance (PSA) programs. It is important to note that local (Santa Cruz County) agricultural agencies such as UC Cooperative Extension, the NRCS, and the Ag Commissioner's Office, were extremely understaffed. As this project filled the much needed outreach effort for the growers/farmers, these agencies provided assistance needed to implement the project. It was really the entire agricultural communities' effort in encouraging the growers to participate, and gain knowledge to save their money for water, fertilizer and energy. A great turnout (over 90) was resulted at the Monterey Region Irrigation, Fertilizer & Pesticide Management Workshop. The nine-month research project on "Nitrogen-Nitrate Accumulation in Strawberry and Lettuce Plant-beds" was completed. This research is practical, and the results are applicable to local growers. Some on-farm assistance programs were rescheduled to begin in mid-February.

Due to the personal health problems facing with the project leader, the schedules for on-farm assistance programs were cancelled, and the project activities ended.

### **Work Description**

#### **PROJECT COORDINATION WITH THE AGRICULTURAL COMMUNITIES AND TECHNICAL SUPPORT GROUP (Professional/Consulting Services Task 1. Coordination with Ag. Communities and agencies, Organizing various groups, facilitation – 2 meetings)**

The purpose of this task is to empower local farming communities to be the leaders in the effort to improve local water quality management. Representatives of local agricultural communities, non-agricultural organizations and agencies will be invited to a meeting to discuss the details of the proposed project at the beginning of the project implementation. The WCC team will seek the agricultural communities for leadership, and the other organizations and agencies for assistance and support using their resources in the implementation of the proposed actions. This group will meet again in the mid-course of the process to review the progress. Dr. Win will coordinate and facilitate these meetings.

#### **DISSEMINATION OF INFORMATION ON ALTERNATIVES IN NUTRIENT/IRRIGATION WATER/SOIL EROSION CONTROL MANAGEMENT**

#### **(Contract – Task 2. Dissemination of Information. Develop web pages and maintain web site. Laminated brochures on Nitrate Quick Test)**

The purpose of this task is to introduce to growers regarding more efficient and cost-saving alternatives in nutrient and irrigation water management, as well as soil erosion control. Most locally acceptable, practical methods will be gathered from the UCCE Growers' Guide, fertilizer industry's efforts in nitrate/nutrient management, and successful local growers' efforts in reducing nitrate leaching and improving water management. Information about the project and locally practical methods that will allow growers to save water, energy, fertilizer, soil nutrients and money while maintaining higher crop yields and preserving the environment, will be disseminated via Internet, bilingual hardcopy prints. Laminated brochures on Soil Nitrate Quick Test with will be produced and distributed to the growers and farm operators free of charge. Web pages will be developed and published throughout the year with monthly updates.

#### **CONDUCTING SEMINAR/WORKSHOP SERIES**

#### **(Contract – Task 3. Seminars/Workshops)**

The purpose of the task is to conduct two half-day seminars and another five half-day workshops during spring and fall. Dr. Win will coordinate with universities (Cooperative Extensions/Cal Poly), farm advisors, scientists, and local growers for participation, and conduct the seminars and workshops. Subjects to be covered include but not limited to:

1. Testing nitrate in water, soils, and plant tissue testing (by scientist/specialists from the private sector)
2. Latest R&D on nutrient management (by major crops) (Farm Advisors, UC-Davis, etc.)
3. Effectiveness in water and nutrient management (by local growers)
4. Compost use and fertilizer needs
5. Drip Irrigation, soil improvement, crop cover and tillage, fertigation, equipment
6. Soil and water Nitrate Quick Test, sap test, nutrient budgeting, etc.

## 7. Soil erosion control techniques and available USDA-NRCS programs, etc.

Scientists and professionals from private consulting firms, fertilizer industry, universities, and the public institutions, as well as local growers who have used BMPs, felt rewarded, saved money, and effectively reduced water and nitrogen fertilizer use, will be invited for guest speakers. Local grower presenters will be assisted in making slides and handouts for their presentations. Simultaneous Spanish translation will be provided to the Spanish-speaking audience. Continuing Education credit and other educational credits will be provided as appropriate. Announcement of the seminar schedule will be made on the Winners' Circle Web Sites as soon as funding for this project is confirmed. Internet Web sites will also include solicitation of sponsorship, speakers, seminar and poster session information. Brochures on the seminar and workshop series will be released. The lists of pesticide applicators filed with County Ag. Commissioner's Office will be used for mailing. The seminar announcement will be distributed through the County Farm Bureaus, NRCS, and local Chamber of Commerce offices in the Monterey Bay Region. These organizations have made commitment to assist. The UC-Davis, Coop Extensions, Ag. Commissioner Office, County Farm Bureaus, Local Water Agencies, ARS, CCOF, the fertilizer industry, Cal Poly, CSA, and local communities will be sought for sponsorship. Dr. Win will organize, coordinate, and carry out the seminar and workshop series. All events will be free of charge.

### ORGANIZING AND CONDUCTING THE WATER QUALITY AWARENESS DAY FAIRE (Contract - Task 4. Water Quality Awareness Faire. Organize and conduct)

The purpose of the task is to recognize agricultural and non-agricultural communities' efforts in project area water quality protection, prevention, and improvement. Dr. Win will organize a special 'water quality awareness' faire. Invitation to universities, private and public firms, and non-profit organizations to open booths with posters, and provide educational information on NPS management measures, ongoing NPS projects and programs, and other related activities. Sponsorship requests will be made to UC-Davis, CSU Monterey Bay, UC-Santa Cruz, Cooperative Extensions, Ag. Commissioner Offices, NRCS', County Farm Bureaus, local water agencies, ARS, CCOF, the fertilizer industry, CDFA-FREP, Cal Poly, CSA, local communities, etc. It will be a community action organized by the WCC. The product will be one one-day event each year. Long and strenuous efforts will be required to organize, publicize and make the day with food, fun and a lot of education. It would be free of charge for participants and faire-comers. A special coordination with the high schools in the Monterey Bay Region will be made to have the high school students a tour to the displays. A special field demonstration may be included.

### PROMOTING SOIL EROSION CONTROL MEASURES (Contract - Task 5. Promoting Soil Erosion Control Measures)

The purpose of the task is to encourage growers to participate in the NRCS technical and USDA cost-sharing programs such as the Environmental Quality Incentive Program (EQIP), the Wildlife Habitat Incentives Program (WHIP), and the Farmland Protection Program (FPP) to curtail on-farm excess nutrients together with soils transported to the water bodies by the surface runoff. Local grower applicants to EQUIP programs in both counties turned out very low in 1998-99 fiscal year. Dr. Win will coordinate with NRCS staff from both counties, and

develop illustrative information about soil erosion control measures, and available USDA/NRCS programs. The NRCS staff will conduct field demonstrations, make presentations at workshops and seminars.

#### PROVIDING ON-FARM TECHNICAL ASSISTANCE

##### **(Contract - Task 6. Field Demonstrations/Technical Assistance)**

The purpose of this task is to allow growers to see scientific, cost-saving, and environmentally friendly methods of on-farm nutrient. Dr. Win will coordinate with UCCE farm advisors, scientists, and researchers; fertilizer industry field agents; and growers who have used nutrient management practices successfully. Technical assistance will be provided at farms hosted by local growers throughout the project area. Related information will be produced in English/Spanish language brochures, and distributed to participants. Specifically, neighbor-growers situated around the host-grower's property will be invited to observe the field demonstrations, and all interested growers in the project area will be notified and invited. On-farm technical assistance programs include the following:

Monitoring Nitrate Accumulations in Strawberry and Lettuce plant-beds: California's highest concentration of strawberry farms and lettuce row crops can be found in the study area, located mostly on the sandy, sloping terrain, from the hill tops to the banks of water bodies. This monitoring program is to set up experimental fields in cooperating growers' strawberry and lettuce farms, and providing services to growers, accumulation of nitrogen-nitrate in the plant beds. Soil Control Lab, a partner to the WCC will perform soil sample collections from the 10 zones of a plant bed from for 10 months from two strawberry fields and two lettuce fields (400 samples). A comprehensive lab test of the soil samples will be conducted to analyze the accumulation of nitrogen-nitrate. Results and useful interpretations and recommendations will be reported to the growers. Soil Control Lab will be funded for two farms. Soil Control Lab will include two extra farms in this program as its 'matching'. A technical report will be prepared, and published. This effort will be totally free of charge to the host grower(s).

Soil Nitrate Quick Test: This task will be subcontracted to Soil Control Lab. Soil Control Lab team will teach farm operators how to take soil samples and perform nitrate testing on their farms. It will be free of charge to the participating growers. A total of 10 growers/operators will be taught how to take soil samples, and test for nitrogen-nitrate. Farm operator(s) will be provided bilingual, laminated soil-nitrate-quick-test guideline sheets.

Voluntary Nitrate Testing of Well Water: Almost all growers use groundwater for irrigation in the project area. This task will: (1) serve as a mechanism to educate the public on nitrate contamination; (2) raise awareness of level of nitrate in the irrigation water possibly from nitrate leaching; and (3) allow the growers to use changes of nitrate levels as an indicator for monitoring purposes. The Santa Cruz County Environmental Health Services Agency has offered to assist in conducting water sample tests for nitrate. The Soil Control Lab will assist in the interpretation of lab results, and make recommendations to the well owners. Dr. Win will assist domestic well owners in testing their well water. A total of 100 water tests will be made. Free of charge assistance will be given to well owners in testing nitrate level in well water.

#### **Results, Discussion and Conclusion**

Task 1. Coordination with Ag. Communities and agencies, Organizing various groups, facilitation – (2 meetings)

Coordination on the overall Pajaro Valley Nutrient Management Education and Outreach project, and its programs were made with representatives from agricultural cultural communities, agencies and organizations on September 9, October 6 and October 13, 2000. The attendees reviewed and discussed the programs.

Practically, the representatives of the cooperators and collaborators as well as the agricultural communities have preferred communicating through the Internet (e-mailing), instead of spending time in a meeting room. As their preferred choice, numerous meetings were held individually at their offices.

As advisors to the project, the Ag Commissioners, the Farm Bureau President and executive director, the Latino Chamber of Commerce Executive Director, the Strawberry Commission Chair, the RCD Chair and staff, NRCS and UCCE directors and field advisors, Pajaro Valley Water Management Agency staff, spared their time to discuss issues related to the programs, and gave suggestions for the implementation of the programs. As committed, they provided support to the project in every way possible as time and resources permitted.

Task 2. Dissemination of Information. (Develop web pages and maintain web site. Laminated brochures on Nitrate Quick Test)

WEB: Information about the project and updates were published, at first, on the website: **[www.mbay.net/~winners](http://www.mbay.net/~winners)**. Later a new website: **[www.nutrient-winners.com](http://www.nutrient-winners.com)** was established and information on the events and related information, and their updates were published. Most of the announcements and information about the events were published in both English and Spanish languages. For major events, simultaneous Spanish translations were provided to the growers who speak Spanish only. Handouts, notes and papers used in the events were translated into Spanish language as time and labor permitted.

It is important to understand how the communication among the growers and agricultural communities established. Because of the confidentiality, direct access to the growers'e-mail addresses were few (about 20), however, major agricultural organizations and agencies have obtained information from the project website and relayed it to their (member) growers. The agricultural organizations (Grower-Shipper Vegetable Association -GSVA, Dole, Berry Coop, Driscoll's, Farm Bureaus, NRCS's, etc.) will not release their member- growers' email addresses for direct access by the project. But, these organizations made links to the project website, and relayed special messages (notices) about the events to their member growers. According to the GSVA, its membership has been almost 400, of which 80% have Internet access at their offices, and 50% of them have Internet access at home. The announcements, summary of the events, some calculations and answers for questions used in the irrigation and fertilization were published on the website.

NQT BROCHURE: A step-by-step Nitrate Quick Test brochure was developed, printed in color, and laminated. Forty brochures were produced in English, and the other 40 were produced in Spanish. Because 50% of local farmers in this project area speaks Spanish only, Spanish translation was essential. The purpose for laminating was to make the growers

available with a long-lasting instructional material (Nitrate Quick Test-NQT) which can be kept in their trucks, and referred to whenever they apply NQT.

The cost for color printing, making color copies and laminating of 80 copies alone exceeded \$300 funded by the CDFA. It is important to note that there were a series of tasks involved in developing the NQT brochure (such as setting up a demonstration, making pictures, developing, color printing, reproduction of the original print in color, preparation of text in English and Spanish, and lamination). To make this process successful, the NRCS staff participated and assisted the program as a fulfillment meeting their commitment to jointly prepare informational materials on promoting soil control measures (Task 5).

### Task 3. Seminars/Workshops

Two workshops were conducted during the early farming season. The *Nitrate Quick Test Field Demonstration* was held on March 30, 2000 at the Tom Amrhein's Ranch located on the bank of Elkhorn Slough. Dr. Tim Hartz of UC Davis led the demonstration. A total of 20 people attended the workshop. Another workshop, *Nutrient Management Workshop*, was held on October 27, 2000 at the UCCE Auditorium in Watsonville. The speakers included Bob Martin (Rio Farms), Richard Smith (UCCE-Salinas), John Olivas (BioSci), Ric Foell (Helena Chemical Co.), and Dr. U Win. The growers were encouraged to bring in their soil and water samples from their farms. The participants practiced the Step-by-Step NQT approach as Mr. Smith and Dr. Win led the demonstration, and tested their water and soil samples. It was a very exciting experience for the grower attendees. The attendance was very low – only five growers showed up. Therefore the rest of the workshops were rescheduled for the winter season.

During the winter season when the ground became wet, and growers/farmers completed farming and wrapping up their operations, two workshops and a day-long seminar were conducted. A workshop on *Nitrogen-Nitrate Accumulation in Strawberry and Lettuce Plant-beds* was scheduled for December 12, 2000. After making all out effort by field staff members of various agencies and organizations, as well as direct mails were made to local growers, phone messages were received from growers who planned to attend this event. Unfortunately, we were all fooled by the mother-nature. It rained heavily throughout the night of December 11 and tapered off in the morning of December 12. Everything including donuts and coffee were ready at the field demonstration site located by the Kirby Park on Elkhorn Road. Only seven people showed up to the site. Growers who planned to attend thought the field day was rain-out and cancelled. Due to the change of weather the day before the event, there was no time to notify growers that the field day was kept as scheduled. In fact, it was sunny at the site by 10:00 am. However, the intermittent showers occurred throughout the region. On January 9, 2001, *Irrigation Scheduling/CIMIS Data Workshop* was held on the campus of CSU-Monterey Bay. Eight growers attended the workshop. Dr. Blane Hanson (UC-Davis) and Dr. Simon Eching of Department of Water Resources provided a hands-on training. At the workshops and the Fair, simultaneous Spanish translations were provided to the audience. Food and beverages were provided free of charge, and no fees were charged to the audience in every event.

To attract targeted audience (growers, farmers, students and the general public) to the Seminar, it was rescheduled for an all-day meeting instead of two half-day meetings, and an exhibition was added to the program. Preparation for the Seminar took almost three months. We were successfully managed the three-fold challenging tasks – (1) organizing

presenters/exhibitors, (2) reaching (messages about the Fair & Ag Expo) out to the target audience, and (3) preparations for Seminar day. Changes to the original plan of event was made: (1) instead of scheduled two half-days, an all-day seminar was rescheduled; (2) a special focus in providing Spanish languish translation, and information materials to Spanish only speakers; and (3) inclusion of private vendors with their exhibits. The regional ***Irrigation, Fertilizer & Pesticide Management Seminar*** held in Watsonville on February 13<sup>th</sup>, 2001 was a success – a total of 92 people, including growers, PCAs, and CCAs, attended the meeting. Half of the growers attended were Spanish speakers.

#### Task 4. Water Quality Awareness Day Fair and Ag. Expo – 2000:

It was a successful event held at the Santa Cruz County Fairground in Watsonville. Signs and posters were posted in major intersections. It took more than four months to organize and implement this task. Cooperating agricultural communities and agencies notified the event to their members and clients. Local newspapers More than 40 exhibitors, including the CDFA-FREP, from public and private Sectors participated in the event. A total of approximately 150 people, visited the event.

#### Task 5. Promoting Soil Control Measures:

Because of the shortage of field staff in both Monterey and Santa Cruz County NRCS offices, production of materials for soil control measures was impossible for the NRCS's. As soil nutrient management is an important task for NRCS, the NRCS assigned a staff member to assist in the development of the Step-by-Step NQT brochure (Task 2), after a series of meetings were held. With the joint effort made by NRCS, the bilingual NQT brochure was developed. NRCS staff assisted in field demonstration and presentations at the workshops and seminars.

#### Task 6. Field Demonstration/Technical Assistance – 2 strawberry farm Nitrate analysis:

It is a research project using 5 farms from different locations, collaborated by growers. Also, collaborated by UC Davis scientists, the accumulation of nitrogen as a result of the use of different types of fertilizers in the plant-beds were analyzed. Soil samples from 10 profiles of each plant-bed at five farm-sites were collected monthly beginning February through October 2000. Compilation of data, and analysis of 450 soil samples were made. A presentation on this effort was made by Frank Shields, Principal Researcher, at the *Irrigation, Fertilizer & Pesticide Management Seminar* on February 13<sup>th</sup>, 2001. A report, Accumulation of Nitrates and Soluble Salts in Strawberry and Lettuce Beds, was prepared. A copy of the report is provided to CDFA-FREP as an attachment.

### **Project Evaluation**

**Graphic design work for project:** It was prepared by Joe Jackson Consulting Services, a business owned by a disabled veteran (license # 2482). It fulfilled the requirement of CDFA Contracting Department. (complete)



**Spanish translations on information materials, at workshops and seminars:** Spanish translations of information materials and simultaneous translations were provided at the seminar and workshops. Cooperating agencies provided free of charge services. (No cost to the project. No FREP funds was used.) (complete)

**The use of nitrogen-nitrate measuring equipment:** Advised by Dr. Tim Hartz, Nitrate Quick Test (NQT) strips were used in measuring N-NO<sub>3</sub> in water and soils. (Saved the cost for additional equipment. Less fund spent.) (complete)

**Web Publications:** Information about the project, notification of upcoming events, information about the events were published. Nearly 900 hits were received. As we speak, people are making access to this site for information. Other agencies and agricultural organizations linked this web site, and relayed the project information to their clients/members. (complete)

**Laminated, illustrated NQT Step-by-Step Brochure:** 40 sets in English and another 40 sets in Spanish were produced and distributed. (complete)

**Completion of 2 half-day Seminars:** Instead of two half-day seminars, one all-day Seminar was held. The Monterey Bay Region Irrigation, Fertilizer and Pesticide Management Seminar-2001 was held in Watsonville on February 13, 2001. A total of 92 people attended the Seminar. (complete)

**Completion of 5 half-day workshops:** Completed 4 workshops.

**Completion of Water Quality Awareness Day Fair:** Pajaro Valley Water Quality Awareness Day Fair and Agricultural Expo was successfully held at the Santa Cruz County Fairground in Watsonville on October 17, 2000. (complete)

**NRCS promotional materials:** Assisted by NRCS, the Step-by-Step NQT brochure was produced. (complete)

**A research report on strawberry/lettuce nitrogen-nitrate accumulation analysis:** Collection and lab analysis of 450 soil samples over 10 months were completed. A report was prepared and submitted to FREP. A presentation was made about this research at the Seminar. (complete)

**NQT on-farm assistance:** Cancelled

**Nitrate in Well Water Tests:** Cancelled

**An Annual Report:** (This report) submitting. (complete)

### **Outreach Activities**

March 30, 2000 Tom AmRhein's farm, 694 Elkhorn Rd., Royal Oaks. *Nitrate Quick Test: A Hands-on Field Demonstration* - (20 participants – growers, ag. Reps., etc.)

October 17, 2000 Santa Cruz County Fairground, Watsonville. *Pajaro Valley Water Quality Awareness Day Faire & Ag. Expo-2000*. (40 exhibitors and 150 visitors – growers, students, etc.)

October 27, 2000 UCCE Auditorium, 1432 Freedom Blvd., Watsonville. Nutrient Management Workshop (8 presenters, exhibitors and Spanish translators, and 4 growers)  
Nitrogen-Nitrate Budgeting  
Why Testing of Nitrate in Water is Important?  
Petiole Tissue Testing & Soil Nitrate Quick Test  
Discussion on the Reduction of Nitrate Leaching

December 12, 2000 Kirby Park, Elkhorn Rd., Royal Oaks. *Nitrogen-Nitrate Accumulation in Strawberry and Lettuce Plant-beds*. (5 presenter, coordinator, translators, and 2 ag. Representatives) -- rained-out.

January 9, 2001 CSUMB-SIVA Resources Center, Seaside. *Irrigation Scheduling and CIMIS Data Workshop*. (3 presenters and 8 growers)

February 13, 2001 Elks Lodge, Watsonville. *Monterey Bay Region Irrigation, Fertilizer & Pesticide Management Seminar-2001* (92 participants – growers, farmers, PCAs and CCAs, etc.)

CDFA-Fertilizer Research & Education Program (Update)  
Accumulation of Nitrate in Strawberry and Lettuce Plant-beds  
Management of Root Diseases of Strawberry  
Biologically Friendly Nutrients in the  
Strawberry Growth and Yield with Three Years of Drip Fumigation  
Irrigation Systems, Practices and Designs Improvements for Water  
Pesticide Regulations - Update  
Fertilizer Movements in the Rootzones  
Soil Nutrient Conservation -- Local Experiences  
Drip Irrigation & Fertilization: Santa Maria Experience  
Pesticides in the Chemical Industry: Is there a new trend  
Nitrogen, Nutrition & Fertilization of Wine Grapes  
Strawberry Irrigation  
Remote Sensing & Precision Farming