Department of Health Clean Water Branch Polluted Runoff Control Program

Quarterly Status Reporting Form
Clean Water Act 319(h) NPS Implementation Program

Quarterly Status Reports are required per contract terms. If no work was done during the reporting period, the CONTRACTOR must provide an explanation of the circumstances.

This Quarterly Status Report is for the period indicated below **(check only one and insert year)**:

- ☐ January 1 – March 31, _____ (Due April 15th)
- ☐ April 1- June 30, _____ (Due July 15th)
- ☐ July 1 – September 30, _____ (Due October 15th)
- ■ October 1 – December 31, 2021 (Due January 15th)

Project Title: Implementing Soil Management Strategies and Soil Testing Technologies to Reduce Nutrient Loading for Intensive Farms on Oahu

Project Start/Completion Date: August 2019

Estimated % of Project Completed: 85%

Estimated % of Grant Funds Previously Requested: 0%

Quarterly Status Report Number: 10

Name, telephone number, and e-mail of person to be contacted for questions regarding this report: Jonathan Deenik, 808-956-6906, jdeenik@hawaii.edu

Please provide the following information for this reporting period. Additional sheets may be attached:

1. Progress/tasks started and/or completed as defined in the Contract's Scope of Services during **current** reporting period.

    A. Summary of work completed (list all tasks and deliverables)

Task/Deliverable	Due Date	Date Task Completed/ Deliverable Submitted
Monitoring soil nitrate status in treatment plots	Ongoing	Monitoring occurred at MA`O and Aloun Farms. Analysis of samples ongoing.
Monitoring crop yield in treatment plots	Ongoing	Harvest activities occurred at MA'O, Aloun, and Tolentino Farms
Assessing fertilizer effects on crop tissue N and P concentrations	Ongoing	Tissue samples from Aloun Farm analyzed

B. GRTS Load Reductions

Pollutant	Estimated Load Reduction
Nitrogen (lbs/yr)	<u>Aloun Farm (head cabbage crop harvested 11/4/2021)</u>: 1. FP: 350 lbsN/ac 2. FP-pre-plant: 290 lbs/ac (60 lbs N reduction) 3. FP – P: 290 lbs/ac 4. N1: 200 lbs N/ac (150 lbs N/ac reduction) 5. N2: 200 lbs N/ac (150 lbs N/ac reduction) <u>MA'O Farm (root crop planted 9/14/2021)</u>: 1. Farmer practice = 175 lb N/ac 2. ½ Farmer practice = 87 lb N/ac 3. Feather meal (12-0-0) = 175 lb N/ac 4. ½ Feather meal (12-0-0) = 87 lb N/ac) <u>MA'O Farm (salad mix crop planted 11/20/2021)</u>: 1. Farmer practice = 560lb N/ac 2. ¾ Farmer practice = 425lb N/ac 3. Feather meal (12-0-0) = 560 lb N/ac 4. ¾ Feather meal (12-0-0) = 425 lb N/ac) <u>Tolentino Farm (new eggplant crop planted)</u>: 1. ¾ FP (750 lbs N/ac= 250 lb N reduction) 2. ½ FP (500 lbs N/ac= 500 lb N reduction) 3. ¼ FP (250 lbs N/ac= 750 lb N reduction) 4. ⅛ FP (125 lbs N/ac= 875 lb N reduction)
Phosphorus (lbs/yr)	<u>Aloun Farm</u>: 1. FP-preplant: 92 lbs P/ac reduction 2. No P treatments (FP-P, N1, &N2) = 131 lbs P/ac reduction <u>MA'O Farm</u>: 1. ¾ Farmer practice = 12.5 lb P/ac reduction 2. Feather meal (12-0-0) = 50 lb P/ac reduction

	3. ¾ Feather meal (12-0-0) = 50 lb P/ac reduction
Sediment (tons/yr)	Not available

C. Narrative Progress Report

Tolentino Farm:

- Eggplant harvest events occurred on 11/11, 11/22, and 12/17.

MA'O Organic Farm:

- Root crop trial harvested 10/22/2021.
- Salad mix harvests occurred on 12/22 and 12/29
- Soil nitrate sampling ongoing.

Aloun Farm:

- Head cabbage trial in Kunia harvested 11/21/2021.
- Soil nitrate sampling ongoing.

2. Description of any major issues/problems encountered and/or resolved that may affect the CONTRACTOR's ability to complete the project as required (i.e., weather, personnel, equipment, etc.). If there is a change in the project timeline or budget, provide an explanation, revised timeline, budget, and completion schedule. (Please note that no-cost extensions must be applied for through the Department, and will only be granted when the CONTRACTOR has demonstrated unforeseeable setbacks.)

   a. No major problems to report.
   b. Although we continue to experience heavy pest pressure on the eggplant trial at Tolentino's, we have resumed harvests.
   c. High caseloads of COVID-19 continue to interfere with outreach efforts.

3. Description of any significant findings, results, or conclusions. If none, please indicate so.

Tolentino Farm

Heavy thrips infestation across the whole eggplant field during later September 2021 put the trial on hold throughout October. The infestation caused severe damage to the plants. Harvest activities resumed in November. The reduced nitrogen treatments showed lower yields than the Farmer Practice on the Nov. 22 harvest date, but all N reduction plots showed a rise in eggplant productivity on the Dec. 17 harvest (Fig. 1).

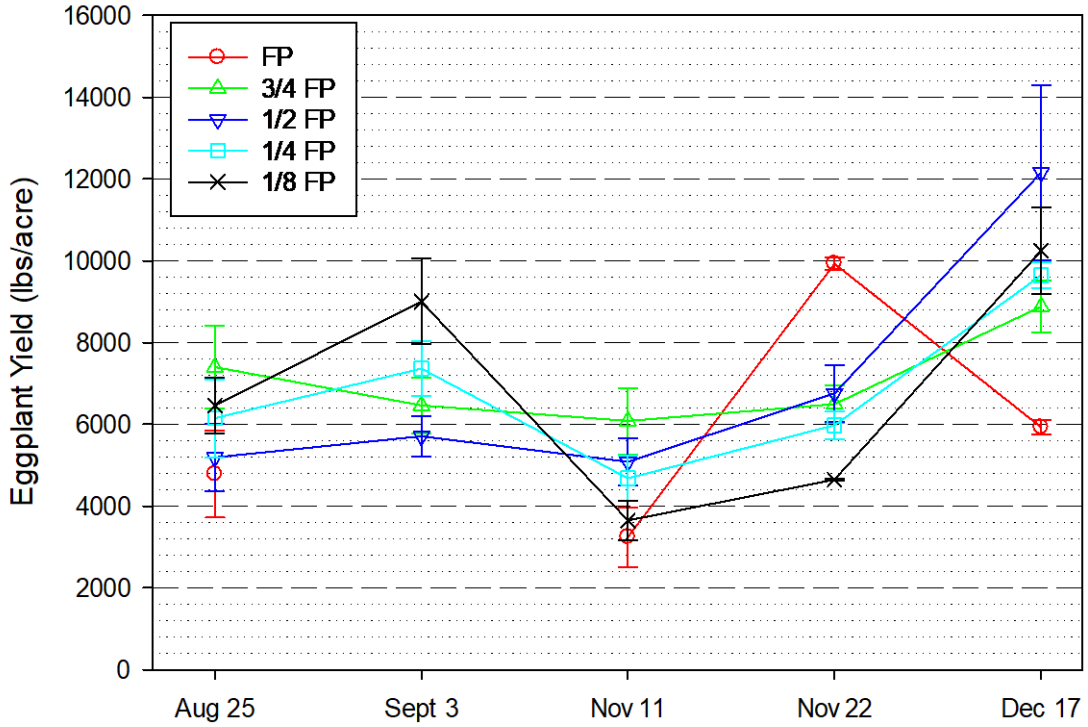

Figure 1. The effects of reducing fertilizer inputs on eggplant yield at Tolentino Farm.

MA'O Farm

1. Turnip Crop: Alternative fertilizer practices on the turnip crop harvested on 10/22/2021 showed reduced yields compared to the Farmer Practice (Fig. 2). The Feather Meal fertilizer at full N equal to the Farmer Practice caused a 25% reduction in yield and cutting fertilizer N input by half caused a 35% yield reduction.
2. Mizuna Crop: Figure 3 shows that at first cutting (12/22) fertilizer alternative (Feather Meal) and a 25% reduction in N inputs had no observable effect on mizuna yield. However, by the second planting as the mizuna crop was growing more vigorously, mean mizuna yield was 15 to 25% lower in the alternative fertilizer treatments. While there is overlap in error bars across the fertilizer treatments suggesting that the effect may not be significant, a potential 15-25% yield loss is likely not acceptable to the farmer. These results suggest that the Farmer Practice fertilizer application is better to ensure no potential loss in yield.
3. Lettuce mix: Figure 4 shows that at first cutting (12/22) fertilizer alternative (Feather Meal) and a 25% reduction in N inputs had little to no observable effect on lettuce yield. However, by the second planting as the lettuce crop was growing more vigorously, mean lettuce yield was up to 30% lower in the reduced N fertilizer treatments; such a potential loss is risky and

unattractive. The Feather Meal at the full N rate produced similar yields to the Farmer Practice.

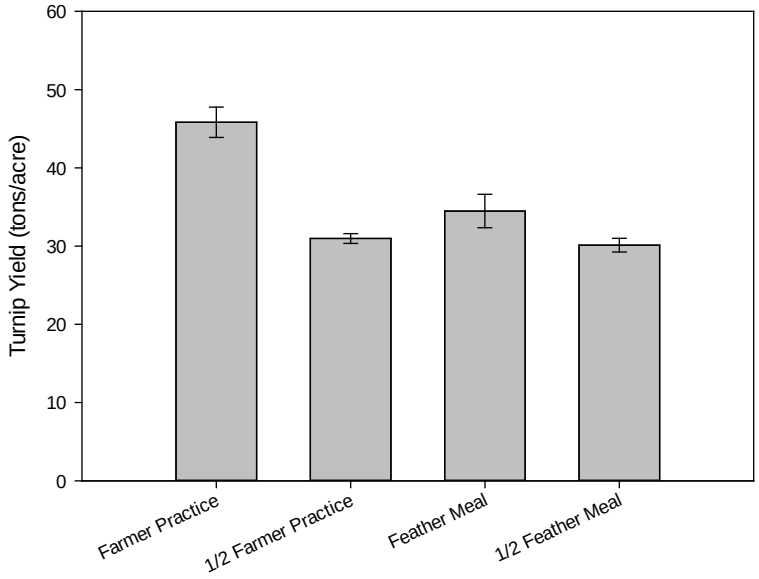

Figure 2. The effects of alternative fertilizer inputs on turnip yield at MA'O Farm.

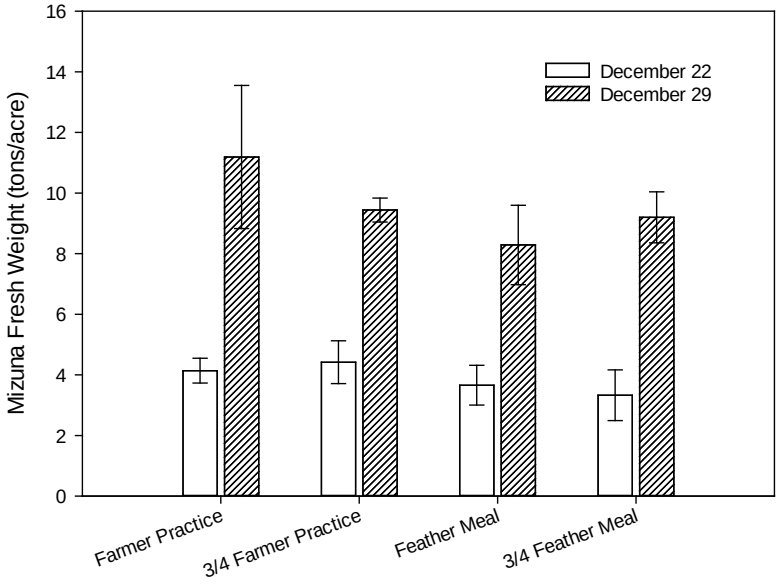

Figure 3. The effects of alternative fertilizer inputs on mizuna yield at MA'O Farm.

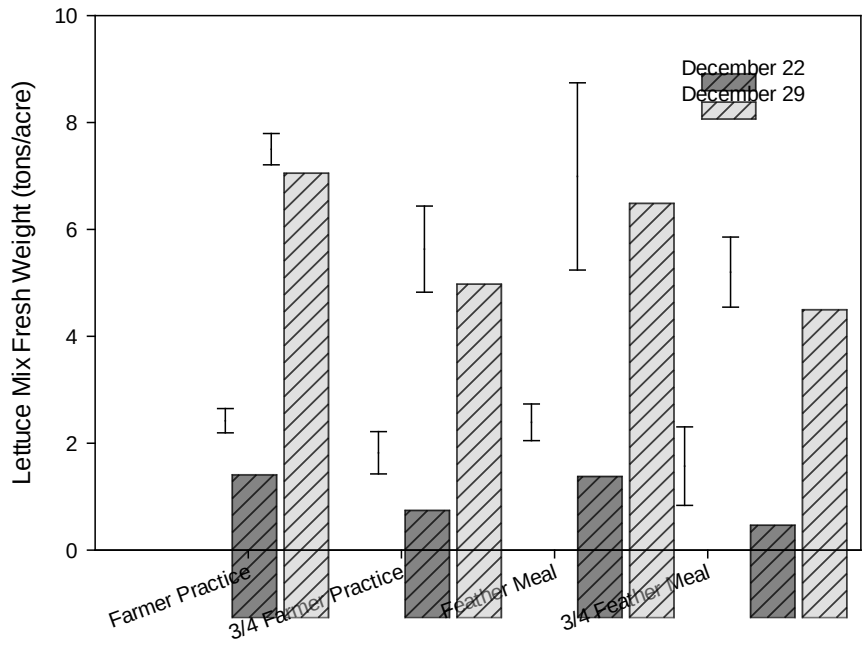

Figure 4. The effects of alternative fertilizer inputs on lettuce yield at MA'O Farm.

Aloun Farm

A head cabbage trial was established at Aloun Farm in Kunia consisting of five fertilizer treatments: 1) grower practice (GP) N at 350 lbs/ac + P at 131 lbs/ac, 2) grower practice minus pre-plant P (GP – Pre) with P at 39 lbs/ac, 3) grower practice without any P (GP –P –Pre), 4) GP -30%N at 200 lbs N/ac and no P, (GP -30%N), and 5) GP -30%N plus N stabilizer and no P (GP -30%N + Stab). In the last fertilizer treatment, we test a new product that inhibits the nitrification process (conversion of fertilizer NH_4^+ to NO_3^-), which should reduce N losses from the root zone during the crop cycle. Figure 5 shows that three of the alternative fertilizer treatments (GP – Pre, GP –P –Pre, and GP -30%N) produced similar cabbage yields as the grower practice with substantial reductions in fertilizer application. The GP -30%N + Stab treatment, with highest reduction in fertilizer application, produced the highest average yield and low variability (small error bar). These data indicate that Aloun farm can reduce fertilizer applications and still get acceptable cabbage yields. As illustrated in Figure 6, reducing N and P fertilizers had no significant effect on the concentration of these elements in the cabbage biomass.

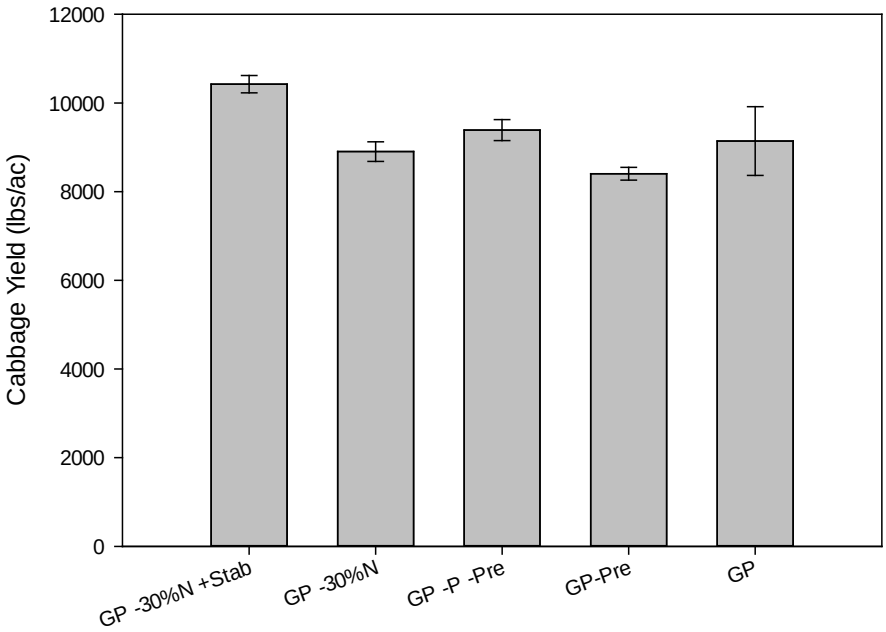

Figure 5. The effects of alternative fertilizer inputs on head cabbage yield at Aloun Farm.

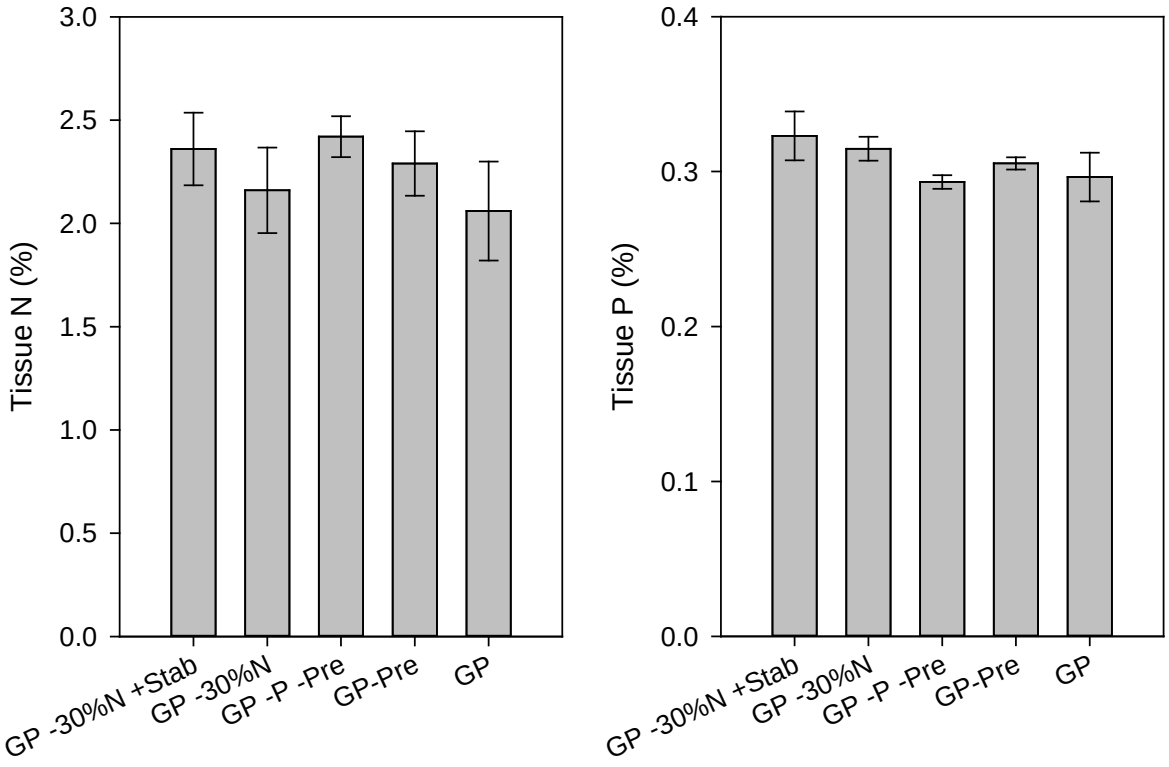

Figure 6. Aletrnative fertilizer effects on nitrogen and phosphorus concentrations in head cabbage biomass.

Based on the Scope of Services, a description of tasks expected to be completed in the next reporting period.

Description of tasks for next reporting period:

a. Demonstration trials are ongoing at Tolentino, Kaneshiro, MA'O, and Aloun Farms.
b. Laboratory analysis of soil nitrate is ongoing and results will be reported in the next period.

Summary of expenditures and in-kind contributions previously requested in comparison with the Contract's project budget and remaining funds. The summary must be actual cumulative amounts for each line item (i.e., personnel services, travel, operating expenses, equipment acquisition, construction materials, other, etc.) current as of this quarterly status report. Please see the example on Page 4 if necessary.

Grant Funds

No.	Description	Original Contract Amount	Contract Amounts from Preceding QSR	Expenditures during this Quarterly Reporting Period	C A E
A	Personnel Services	$244,440.28	$0	$17,982.23	$
B.	Travel (mileage)	$1560	$0	$306.65	$
C.	Operating Expenses	$16,830	$0	$700.72	$
D.	Equipment	$1200	$0	$0	$
E.	Professional Services	$14,420	$0	$0	$
F.	Construction Materials and Supplies	$0	$0	$0	$
G.	Other Misc. Expenses	$1500	$0	$0	$
	TOTALS	$279,950.28	$0.00	$18,989.60	$156,095.15

In-Kind Contributions (Matching Funds)

No.	Description	Original Contribution Amounts	Contribution Amounts from Preceding QSR	Contributions during this Quarterly Reporting Period	C A
A	Personnel Services	$94,461.44	$15,831.60	$15,831.60	$
B.	Travel	$	$	$	$
C.	Operating Expenses	$	$	$	$
D.	Equipment	$	$	$	$
E.	Professional Services	$	$	$	$
F.	Construction Materials and Supplies	$	$	$	$
G.	Other Misc. Expenses	$	$	$	$
	TOTALS	$94,461.44	$15,831.60		$65,711.00

In this ***example***, the Contract's overall project budget for Personnel Services is $10,000.00, with $15,000.00 in Match. The Travel Budget is $1,200.00 with $1,000.00 in Match. Due to space constraints, Categories C - G were not listed in this example but shall be included with official QSRs and reimbursement requests. In the first Quarterly Grant Expense Report, the CONTRACTOR requests a $500.00 reimbursement, and claims $200.00 in Match:

Grant Funds

No.	Description	Original Contract Amount	Contract Amounts from Preceding QSR	Expenditures during this Quarterly Reporting Period	C A I
A	Personnel Services	$10,000.00	$0.00	$500.00	$
B	Travel	$1,200.00	$0.00	$0.00	$
	TOTALS	$11,200.00	$0.00	$500.00	

In-Kind Contributions (Matching Funds)

No.	Description	Original Contribution Amounts	Contribution Amounts from Preceding QSR	Contributions during this Quarterly Reporting Period	C A
A	Personnel Services	$15,000.00	$0.00	$200.00	$
B	Travel	$1,000.00	$0.00	$0.00	$
	TOTALS	$16,000.00	$0.00	$200.00	

With QSR #2, the CONTRACTOR requests a $1,500.00 reimbursement and claims $500.00 in Match for Personnel, and $200.00 in Match for Travel (Note that the "Original Contract Amount" Column never changes, and the "Contract Amounts from Preceding QSR" Column in QSR #2 is identical to the "Current Contract Amounts" Column in QSR #1):

Grant Funds

No.	Description	Original Contract Amount	Contract Amounts from Preceding QSR	Expenditures during this Quarterly Reporting Period	C A I
A	Personnel Services	$10,000.00	$9,500.00	$1,500.00	$
B	Travel	$1,200.00	$1,200.00	$0.00	$
	TOTALS	$11,200.00	$10,700.00		
	$1,500.00	$9,200.00			

In-Kind Contributions (Matching Funds)

No.	Description	Original Contribution Amounts	Contribution Amounts from Preceding QSR	Contributions during this Quarterly Reporting Period	C A
A	Personnel Services	$15,000.00	$14,800.00	$500.00	$
B	Travel	$1,000.00	$1,000.00	$200.00	$
	TOTALS	$16,000.00	$15,800.00	$700.00	