O`AHU RC&D

O‘ahu Resource Conservation & Development Council

PO Box 209, Kunia, Hawaii 96759 ◆ 808-622-9026 ◆ www.oahurcd.org

FINAL PROJECT REPORT
December 21, 2011

Conservation Innovation Grant
Agreement Number: 69-3A75-7-115
Grantee Name: O‘ahu Resource Conservation & Development Council
Project Title: Accelerating Cover Crop Technology Adoption through Field Demonstrations Using Sunn Hemp, Oats, and Buckwheat in Rotational Commercial Crops
Project Director: Jean Brokish (as of July 15, 2011)
Contact Information: Phone: (808) 622-9026
Email: jean.brokish@oahurcd.org
Period Covered by Report: November 1, 2007 – September 21, 2011
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The overall goal of this project was to increase adoption of cover crop technology by: 1) demonstrating the impact of sunn hemp, oats and buckwheat on commercial crops; and 2) overcoming implementation barriers by quantifying pests, soil fertility and economic benefits. Over the course of the project numerous activities were accomplished to successfully meet the identified goals. This final report briefly recaps activities per project “Deliverables.”

A. Attend at least one meeting hosted by NRCS, providing technical feedback.
Various meetings with project partners were held throughout the project. A meeting was held in March 2010 to specifically share results and gather feedback from NRCS technical staff. See discussion under “Deliverable D” for a summary of lessons learned and recommendations for Field Office Technical Guide (FOTG) materials.

B. Fourteen demonstration plantings on the five major agricultural islands.
Established 14 demonstration sites. See Table 1 for farm locations and crop information.

C. Field days held at each of the fourteen demonstration sites
Fourteen field days held. See Table 1 for field day dates and participant information.

Table 1: Summary of Demonstration Sites and Field Days

COOPERATOR	LOCATION	ISLAND	CROP	FIELD DAY	ATTENDEES
Twin Bridge Farms	Waialua	Oahu	Tomatoes	1/23/2008	32
Mohala Farms	Waialua	Oahu	Organic row crops	2/16/2008	23
Hawaii Ag. Research Center	Kunia	Oahu	Sweet Potatoes	6/24/2008	70
Pioneer Hi-Bred, Int'l	Waialua	Oahu	Seed corn	8/5/2008	35
Kapalua Farm	Kapalua	Maui	Organic row crops	11/14/2008	40
Sibucao Papaya Farm	Hiloi	Hawaii	Papaya	12/18/2008	15
Kauai Coffee	Kalaheo	Kauai	Coffee	4/2/2009	25
Jeno Enocencio	Hilo	Hawaii	Papaya	7/16/2009	14
Greenwell Farms	Kona	Hawaii	Coffee	9/25/2009	33
Rick Tamanaha	Hoolehua	Molokai	Papaya	1/14/2010	23
Andres Saguibo	Waialua	Oahu	Mixed row crops	3/25/2010	13
James Twigg-Smith	Keeau	Hawaii	Jatropha	7/1/2010	5
Alembic International	Hamakua	Hawaii	Sweet Potatoes	N/A	
Dole Food Co.	Waialua	Oahu	Coffee	N/A	
Orlando Manuel	Pohoiki	Hawaii	Papaya	N/A	
Mokuau / DeCoite		Molokai	Sweet Potatoes	N/A	
OUTREACH / INFORMATIONAL FIELD DAYS					
HACD Conference	Mauna Kea	Hawaii	Project Overview	6/18/2009	80
Kona Coffee Expo	Kona	Hawaii	Project Overview	1/29/2010	45

D. Field scale demonstrations to evaluate cover crop technology, including agronomic and economic assessment. Information to be provided to NRCS for use in the FOTG.
Data from all 14 sites showed significant weed suppression with cover crops, resulting in a cost savings (reduced pesticide application).

Despite sunn hemp's ability to suppress nematodes, there was no significant difference between cover crop plots and plots without cover crops.

Some plots showed improved soil fertility characteristics, but the results were not consistent. It is expected that repeated cover crop use would show a significant difference on soil fertility.

Data and observations from each site were used to develop seven general recommendations, which were shared with NRCS technology staff.

1. Cover crops were able to enhance soil electrical conductivity (EC) by either contributing soil nutrients or increasing the cation exchange capacity.
2. Cover crops were able to reduce loss of some soil nutrients as compared to the bare ground practice. The mechanism for reduced nutrient loss may have been a result of increased organic matter which usually increases cation exchange capacity and increases water percolation (thereby decreasing soil nutrient runoff).
3. Cover crops are able to reduce soil erosion.
4. Cover crops are very effective at suppressing weeds.
5. Germination and vigor of the cover crop plantings varied widely depending on the soil quality (fertility), presence of soil (vs. rock) and pest pressure on cover crops (snails, slugs, birds and possibly rodents).
6. Selection and management of cover crops should be farm-specific.
7. Yield response to the cover crops will differ depending on the nutrient requirement of the cash crop.

Five sites were selected for yield analysis. See results in Table 2. Cover crops did not show a significant yield effect for three of the crops (coffee, papaya and seed corn). Cover crops significantly increased tomato yield, and significantly decreased sweet potato yield. One hypothesis is that the additional nitrogen from cover crops aided tomato yields but suppressed tuber development on the potatoes; however, it is difficult to say conclusively given just one planting cycle.

Table 2: Effect of cover crop plantings on yield

Island	Cash crop	Cover crop	Yield
Oahu	Tomato	sunn hemp	significantly higher
		oats	significantly higher
		buckwheat	not sig
		sunnhemp + bkwt	not sig
		sunnhemp + oats	significantly higher
Oahu	Sweet potato	sunn hemp	significantly lower
		oats	significantly lower
		buckwheat	not sig
		sunnhemp + bkwt	significantly lower
		sunnhemp + oats	significantly lower
Kauai	Coffee	sunn hemp	not sig
		oats	not sig
		buckwheat	not sig
		sunnhemp + bkwt	not sig
		sunnhemp + oats	not sig
Hawaii	Papaya	sunn hemp	not sig
		oats	not sig
		buckwheat	not sig
		sunnhemp + bkwt	not sig
		sunnhemp + oats	not sig
Oahu	Seed corn	sunn hemp	not sig
		oats	not sig
		buckwheat	not sig
		sunnhemp + bkwt	not sig
		sunnhemp + oats	not sig

E. Posters detailing project objectives and outcomes.

Informational materials were developed and shared throughout the project period. A large poster was printed and displayed at the Ag Conference, the Hawaii Conservation Conference and other related outreach events. See Figure 1.

Additional outreach materials were developed to help promote the project, including brochures, planting guidelines, and a Cover Crop Handbook. Project information was also posted to Oahu RC&D's website. Electronic versions of outreach documents were provided with the bi-annual project reports.

Figure 1. Poster detailing project objectives and outcomes.

F. Publish educational materials and project results at the AG Conference

John McHugh (Crop Care) delivered a presentation highlighting different cover crop options and results from the demonstration sites at the 2009 Ag Conference. All related informational materials were available to conference participants.

G. Translation of materials into Ilocano, Laotian, Tagalog, Chinese and Korean to support outreach to immigrant farmers.

Cover Crop Guidelines and Seeding Rates were developed and translated into Chinese, Laotian, Ilocano, Korean and Tagalog. Paper copies distributed at immigrant farmer workshops and available on Oahu RC&D's website.

H. Video record field days and develop a DVD.

A DVD was produced, including footage from field days and project experts. Copies were distributed at outreach events throughout the project period and the file is on YouTube.