Project Title: Plant-based nutrient management for socially disadvantaged organic farmers
Principal Investigator: Aysha Peterson, University of California, Santa Cruz
Funding Cycle: 2019-2020

PROJECT SUMMARY: The aim of this project was to foster more widespread adoption or organic plant-based nutrient management practices (e.g. cover crops) by gathering information to informi farmer assistance services for organic Latina/o farmers in California's Salinas Valley. Research questions included: **(1)** How do organic Latina/o farmers in the Salinas Valley know and utilize plant-based nutrient management practices? **(2)** What field-level challenges to utilizing plant-based nutrient management practices do these farmers experience, and what strategies do they use to overcome these challenges? **(3)** What are the economic, educational, and infrastructural barriers to successful utilization of plant-based nutrient management practices? **(4)** How do responses vary as a function of structural arrangements and social stratification (e.g. age, gender, occupational history). Through collaboration with the Agriculture and Land-Based Training Association, I conducted 5 focus groups with farmers to collect qualitative data in order to answer these questions; I additionally conducted participant observation to substantiate focus group findings. Results indicate that farmers experience numerous field-level barriers to implementation of plant-based nutrient management practices which can be rapidly addressed by regional technical assistance providers. Additionally, findings reveal structural barriers to implementation of these practices, which must be addressed through more comprehensive revisioning of the agricultural industry.

INTRODUCTION TO TOPIC: Plant-based nutrient management practices are widely considered to be a cornerstone of organic agriculture. Diversified crop rotations, cover crops and intercropping, and the incorporation of residues are all effective methods of maintaining soil fertility without polluting local ecosystems with excess nutrients (USDA, 2000). Plant residues can be returned to the soil to increase soil organic matter (SOM) and to improve soil physical, chemical, and biological properties (Kumar & Goh, 1999), while living plants inhibit erosion, reduce nutrient leaching, and build SOM by sloughing off root cells (Fageria et al., 2005). By minimizing pools of inorganic nutrients, these practices enhance nutrient retention for profitable and environmentally-responsible farm management (Drinkwater et al., 2017). Despite widespread advocacy for these practices, many organic farmers struggle to combine plant-based nutrient management strategies with applications of manure, compost, and other soil amendments. Integration of these practices challenges the widespread phenomenon of "input substitution" in which organic farmers may simply substitute less toxic inputs for agrochemical fertilizers (Rosset & Altieri, 1997). As a result, improved adoption of plant-based nutrient management practices will support an agroecological transformation of food systems rather than a more superficial fix, combating inefficient nutrient cycling and reducing nutrient pollution.

Although farmers and scientists report extensive benefits of plant-based nutrient management practices, relatively little research has focused on barriers to implementation. Few, if any, scholarly investigations on the topic have specifically targeted organic-certified operations, yet studies conducted with non-organic producers indicate many different kinds of barriers. In a cover crop adoption study in South Dakota, researchers found that major challenges include stand establishment, time and labor, and seeding the right species for the operation; meanwhile,

findings also revealed that land ownership has a large effect on adoption decisions, as farmers are unlikely to utilize cover crops on land that they are renting (Wang, 2017). The difference between field-level and structural barriers to implementation is discussed by Roesch-McNally et al. (2018) in a study of cover crop adoption in Iowa. Here, researchers found that many farmers were able to use on-farm innovation to overcome field-level challenges, yet economic, educational, and infrastructural barriers constituted the structural limitations of these farmers' decision-making processes. While agricultural context may differ based on region, crop, scale, and organic- certification status, the dialectic between field-level and structural barriers indicates a larger issue. Individual farmers retain a certain amount of agency when it comes to field-level management, yet the structural conditions of U.S. agriculture constrain the possibilities for a given farmer.

In this context, it is particularly important to recognize how certain farmer demographics are structurally marginalized and face considerable obstacles to successfully implementing best nutrient management practices. Intersections of race, class, and other axes of social difference compound challenges for certain farmers and simultaneously produce unequal access to farmer assistance services (National Sustainable Agriculture Coalition, 2018). In recent years, the U.S. Census of Agriculture has revealed a growing number of farmers from racial minority backgrounds even as the total number of farmers has decreased (USDA-NASS, 2012). In the midst of a rapidly aging majority white farming population, support for socially disadvantaged farmers[1] is not only important for fostering a more equitable food system – it is also critical to ushering in a new generation of farmers. This fact is reflected by the Farm Bill's Section 2501 program, which specifically seeks to support minority farmers (National Sustainable Agriculture Coalition, 2017).

Organic agriculture offers many feasible economic strategies for small-farmers who would otherwise be unable to compete with large-scale non-organic producers (Halberg & Muller, 2012). Viability of organic-certified production for socially disadvantaged farming demographics has been reported throughout the U.S. (Hilton, 2015). As a result, improved organic nutrient management strategies offer opportunities to improve livelihoods for many beginning, racial minority farmers. These practices are doubly important in California's Salinas Valley, where rural communities have struggled for decades to access clean water amidst nitrate contamination of local groundwater supplies. Water quality issues are attributed to poor nutrient management practices on surrounding fruit and vegetable farms (Harter & Lund, 2012). Affected communities are largely comprised of low-income Latina/o farmworkers and their descendants who, upon gaining socioeconomic mobility, have begun to develop farming enterprises of their own (Calo & De Master, 2016). As a result, many beginning farmers in the Salinas area have intimate experiences with the impacts of agricultural activities on residential communities. The Agriculture and Land-Based Training Association (ALBA) is a farmer training facility situated within this landscape. ALBA's mission to support socially disadvantaged, limited resource, beginning organic farmers attracts many low-income Latina/o individuals with interest in minimizing nitrate pollution. Improved nutrient management assistance at ALBA therefore has

[1] "Socially Disadvantaged Farmer" is defined in statute (7 U.S.C. 2003) and includes any farmer from a socially disadvantaged group whose members have been subjected to racial, ethnic, or gender prejudice because of their identity as members of a group without regard to their individual qualities.

profound implications for the empowerment of rural low- income communities, allying agricultural practice with both economic opportunity and community health.

Our study utilized qualitative social science research to examine barriers to implementation of plant-based nutrient management strategies among socially disadvantaged farmers in the Salinas Valley. Drawing on Roesch-McNally et al.'s (2018) distinction between field-level and structural obstacles, I investigated (1) farmers' knowledge about and utilization of plant-based nutrient management practices, (2) farmers' strategies for overcoming field-level challenges to implementation, (3) economic, educational, and infrastructural barriers inhibiting use of plant-based nutrient management practices, and (4) variation among farmers in the region with regard to implementation. Through collaboration with ALBA, research incorporated knowledges of local farmers to prioritize the perspectives of those poised to benefit from the research (Pasick et al., 2010). My findings will support adoption of best organic nutrient management practices by improving regional farmer assistance services for socially disadvantaged organic farmers and by offering a case study relevant to other agricultural communities throughout the U.S.

RESEARCH OBJECTIVES: Research objectives included: **(1)** Determine knowledge and utilization of plant-based nutrient management practices among organic Latina/o farmers in the Salinas Valley; **(2)** Assess field-level challenges to utilization of plant-based nutrient management practices and strategies for overcoming these challenges; **(3)** Identify economic, educational, and infrastructural barriers to successful utilization of plant-based nutrient management practices; **(4)** Analyze how responses vary as a function of farmers' structural arrangements and social stratification (e.g. age, gender, occupational history). These objectives remained largely consistent with the objectives outlined in my project proposal. An additional objective of this project was to utilize findings to inform farmer assistance services in the Salinas Valley region, which I am accomplishing through collaboration with ALBA.

MATERIALS AND METHODS: I conducted demographic- and region-specific qualitative social science research in order to improve support services for organic-certified Latina/o farmers in the Salinas Valley region. My approach focused on farmers as agents of change within regional ecosystems while also recognizing the variety of field-level and structural barriers facing Latina/o farmers in this region As a whole, this project was designed to improve farmer assistance services in the area around Salinas, CA. Participants in and alumnae/i of ALBA's programs comprise a vast network of farmers who are predominantly low-income, Latina/o, and locally-based. Following approval from UCSC's Institutional Review Board (#HS3398), I recruited participants from this pool using ALBA staff's communication channels. Criteria for participation included (a) current status as an organic-certified farmer, (b) self-identification as Latina/o, and (c) residence in Monterey county. As outlined in the IRB protocol, I asked for obtained verbal consent from participants before data collection.

I hosted and moderated focus groups, a qualitative research method that provides targeted insight into specific social and cultural norms as well as interactions between participants (Warr, 2005) and can be more cost-effective than individual interviews. I first developed a focus group protocol designed to probe farmers' responses. Groups were then facilitated at ALBA's Rural Development Center in Salinas, CA, a location that is both neutral and central within this

agricultural region. I hosted 5 groups, a quantity that is shown to elicit 90% of all relevant themes (Guest et al., 2016). Group gatherings lasted approximately 2 hours. The protocol provided stimulus material for discussion, including scientific research demonstrating the benefits of plant-based nutrient management practices such as crop rotation, cover cropping, intercropping, green manures, and incorporation of crop residues. I then asked participants to respond to information provided and probed information about (1) current knowledge and utilization, (2) field-level challenges and strategies for overcoming these challenges, (3) economic, informational, and infrastructural barriers to implementation, (4) variation in farmers' experiences. Groups were moderated in Spanish, which is generally the preferred language for farmers in this area. Focus groups were audio recorded.

In addition to conducting focus groups, which I proposed in my original project proposal, I also had the opportunity to conduct 6 months of participant observation with farmers, a qualitative research method in which the researcher joins the group that they are studying in order to gain a better understanding of the issue at hand (Bernard, 2017). I spent 6 months working alongside farmers at their farms in the Salinas area, where I learned firsthand about farmers' nutrient management practices and took ethnographic field notes in order to record observations (Emerson et al.). Findings from these data complement and provide greater cultural context for focus group discussions.

Focus group recordings were transcribed and translated. Transcripts, as well as ethnographic field notes, were then qualitatively analyzed using a hierarchical axial coding procedure following an inductive approach (Corbin and Strauss, 1990). This method is used to examine emergent concepts from discussions.

Despite sharing racial and geographic commonalities, research participants can differ in a variety of manners such as age, occupational history, immigration status, gender, socioeconomic status, scale of farm operation, etc. Although it is common practice to analyze research findings according to predefined comparison groups (such as race, class, and gender), this practice can give undue significance to particular subgroups without examining their theoretical relevance (Glaser & Strauss, 2017). As such, I utilized grounded theory (Corbin and Strauss, 1990) to analyze focus group transcripts and ethnographic field notes following an inductive approach and allowed comparison groups to emerge directly from the data. This process allowed me to examine the significance of structural arrangements and social stratification in shaping participants' responses, but without assuming the importance of particular groupings. During data analysis, I identified important subgroups among research participants and used these to qualitatively code and compare analyzed transcripts and field notes.

PROJECT RESULTS: Analysis of focus group transcripts and field notes revealed insights directly related to each of my research questions. Here I present results clustered around the themes of each question.

Knowledge and utilization of plant-based nutrient management practices: In relation to plant-based nutrient management practices, the most common practices discussed by farmers involved in this study included cover crops, incorporation of residues, and crop rotation. Farmers

showed extensive knowledge about cover crops, including their multiple benefits for nutrient cycling as well as support for beneficial insects; however, they indicated low usage of this technique. Farmers discussed how, while farming at ALBA's Rural Development Center, ALBA staff assisted in cover cropping but that it was difficult to utilize these practices while farming elsewhere. Alternatively, many farmers indicated that they incorporate crop residues and rotate crops on a regular basis. Crop rotation was understood to be an important method of support plant nutrition, while participants exhibited varied understandings of the role of residue incorporation in nutrient management. Conversations specifically queried the importance of time of incorporation in supporting plant nutrition.

Field-level challenges: Field-level challenges discussed by farmers encompassed four main topics. First, participants were concerned with the kinds and combinations of cover crops to use on their farms. They discussed how there are a lot of different kinds of cover crops that can be mixed and used under different circumstances, yet there were many questions about how to choose specific cover crops based on farmers' individual needs and priorities. Second, participants shared concern about the best time to plant cover crops in order to maximize benefits while avoiding putting fields out of production for too long. Third, farmers discussed the challenge of incorporating cover crops and other plant residues for maximum nutrient availability, and expressed concern about timing the planting of field crops in order to obtain nutritional benefits from the cover crops. Fourth, participants deliberated how to test soil, interpret test results, and integrate them into a management plan that includes plant-based nutrient management practices. Some farmers were surprised to hear that soil test laboratories exist, while others had heard about these laboratories but weren't sure about the process for getting soil tested or interpreting results.

Economic, educational, and infrastructural challenges: Beyond field-level challenges, conversations among farmer participants indicated broader structural challenges to implementing plant-based nutrient management practices. My analysis revealed four major challenges. First, farmers discussed the economic challenge of putting fields out of production for a few months in order to utilize cover crops. They indicated that, given their limited financial capital, they rely on rapid returns from their farming operations, which makes it difficult to invest in the long-term benefits provided by cover crops. Second, language barriers were often referenced as a reason for farmers' inability to utilize various plant-based nutrient management practices. Farmers indicated labels of different seed mixes and fertilizer options are in English, soil testing is done in English, websites are usually in English, and most workshops are held in English, such that Spanish-speaking farmers are excluded from spaces where they might better learn about organic farming practices. Third, farmers discussed how website-based sources of information are not particularly useful to them, and that they prefer learning through individualized outreach from trusted, Spanish-speaking technical assistance providers. Fourth, participants indicated that short-term land tenure limits their ability to invest in soil health. Farmers explained that, because they are renting land and are not sure how long they will be at their particular location, long-term soil health strategies such as cover crops and intercropping are a low priority as they are unlikely to see the benefits of these practices.

Variation among respondents: I also examined how respondents vary in the challenges that

they experience. Findings suggest that variation in language(s) spoken, occupational history, and assistance from family members are key factors accounting for variation in challenges experiences. Farmers expressed how those who speak English have a much easier time engaging with educational resources, as well as accessing land and financial resources. Somewhat intuitively, they also indicated that more experienced farmers have had more opportunities to experiment with plant-based nutrient management practices, and have had more opportunities to build the social network needed to overcome structural barriers such as access to land and financial resources. Furthermore, participants discussed how help from family members allows farmers to more easily survive economically, which allows for the time and resources to overcome barriers to implementation.

CONCLUSIONS AND DISCUSSION: Results from this study show, first and foremost, that organic Latina/o farmers in the Salinas Valley have a lot of knowledge about plant-based nutrient management practices that they have gained through a combination of classroom and field-based learning processes; however, these farmers face unique challenges to implementing these practices and their experiences are heterogeneous. Field-level challenges can be addressed relatively quickly by farmer assistance organizations that are working with organic Latina/o farmers in this region, such as ALBA and cooperative extension agencies. Meanwhile, economic, educational, and infrastructural challenges faced by these farmers must be addressed through more comprehensive efforts to address structural inequalities in the agricultural industry. Heterogeneity among participants further reveals inequalities that must be addressed through multi-scalar efforts to support more marginalized farmers.

Despite extensive research on plant-based nutrient management practices in agricultural systems, there remains very little social science research on barriers to implementation. While the industry often relies on farmer assistance providers to gather this information, the systematic approach utilized in this study provides a succinct way of understanding barriers to implementation so that they can be addressed individually and by multi-scalar farmer assistance programs and policies. Targeting organic Latina/o farmers in the Salinas Valley makes results especially useful for ALBA and other technical assistance providers working in this area. For example, each of the field-level challenges identified by this study (discussed above) can be rapidly integrated into education and outreach programs supported by regional organizations. Furthermore, the economic, educational, and infrastructural challenges identified by this study will prove useful for a much wider audience of agricultural professionals, especially those working to support Latina/o farmers across the U.S. As the population of Latina/o farmers grows nationwide, it is becoming increasingly important for farmer assistance programs and policies to address the structural barriers to success faced by this demographic. Findings from this study will be useful for advocacy organizations in order to support access to financial assistance, bilingual sources of information, culturally appropriate modes of sharing information, and access to land, all of which are shown here to enhance implementation of plant-based nutrient management practices.

Despite the utility of findings from this study, the focus group method used here proved to be especially difficult to facilitate. Organic Latina/o farmers in the Salinas Valley have very little flexibility in their schedules and it was difficult to get farmers to take time away from work, even with compensation. Future work will rely more on one-on-one interviews with individual

farmers in order to better accommodate their schedules.

Based on what I have learned in this study, future research should focus more explicitly on structural barriers to implementation of cover crops and other plant-based nutrient management practices. While field-level challenges identified in this study can be easily addressed by regional technical assistance providers, structural challenges related to economics, education, and infrastructure must be understood with more nuance in order to develop programs and policies designed to more comprehensively alter the structure of the agricultural industry. For example, patterns of land tenure that favor white, multi-generational farmers and marginalize the growing number of Latinas/os must be understood and altered in order to support Latina/o farmers' use of more sustainable nutrient management practices. The connection between nutrient management and land tenure, as well as other structural arrangements within the agricultural industry, is rarely discussed by practitioners and remains a crucial barrier to long-term investments in soil health.

OUTREACH: Outreach related to this project has been delayed due to COVID-19 restrictions; however, I am in the process of developing multiple outreach materials and preparing various activities.

Informational videos: In collaboration with an undergraduate research assistance, I am in the process of putting the finishing touches on 5 short outreach videos. Each video utilizes footage from one-day collaborations with individual farmers who share their own experiences navigating the field-level and structural barriers to implementing plant-based nutrient management practices. This participatory approach aims to prioritize farmers' perspectives and will enhance accessibility of information. Completed videos will be hosted online and utilized for educational programming at ALBA as well as UCSC's Center for Agroecology and Sustainable Food Systems (CASFS).

Report for ALBA: In collaboration with ALBA staff, I am in the process of developing a reader-friendly report for ALBA and collaborators documenting research findings. Accessible documentation will allow the organization to improve support services for farmers by enhancing educational programming throughout the Farmer Education Course and improving resources available through the Organic Farm Incubator.

Peer-reviewed, scholarly manuscript: I am also in the process of developing a scholarly manuscript discussing structural barriers to implementation of organic plant-based nutrient management practices, as well as opportunities for intervention. This work will advance theories about the ways that farmers' field-level decisions are embedded within larger structural limitations and will bring critical attention to the linkages between structural arrangements and soil health. For publication, I will target highly-ranked scholarly journals that publish material related to agricultural systems.

Educational workshops: Once restrictions associated with the COVID-19 pandemic are lifted, I plan to host educational workshops to address informational gaps identified by our research findings. Workshops will involve farmer participants as co-presenters and will be held at: (i) ALBA's Rural Development Center in Salinas, CA; (ii) UCSC's CASFS in Santa Cruz, CA, an

educational facility for beginning farmers, university students, and community members; (iii) the annual EcoFarm conference in Pacific Grove, CA, a regional networking and educational hub for farmers, researchers, educators, and others working towards sustainable food systems.

Conference presentations: I had planned to present findings at the Sustainable Agriculture Education Association conference in July of 2020; however, this conference was postponed until 2021 due to the COVID-19 pandemic. I will present at the 2021 conference assuming that it is held as planned and will present on this research at other conferences as I proceed through my PhD program.

FINANCIAL ACCOUNTING: Expenditures made to conduct this project included:

Graduate student researcher: One graduate student researcher (Peterson) was funded during the summer quarter of 2019 based on the UC Santa Cruz academic calendar year, from July 1 through September 30, with a stipend of $7,656.95. This is the official UCSC salary for a summer 2019 graduate student researcher appointment.

Farmer participation: Farmers were compensated for their time at a rate of $25/hr using Visa gift cards. 30 farmers each contributed 2 hours of time (5 x 6-person focus groups x 2 hr focus groups) for a total of $1500. An additional 5 farmers participated in creating short outreach videos, each of which required 8 hrs of collaboration for a total of $1000. The original proposal had not included the cost of tax for purchase of Visa gift cards; however, I received permission from OFRF staff to purchase these gift cards in order to easily compensate farmers. Including the cost of tax, farmer compensation totaled $2,708.

ALBA: ALBA staff members were compensated for their time at a rate of $75/hr x 40 hrs for a total of $3000. ALBA was also compensated $150/hr for room rental at their Rural Development Center in Salinas, CA for 5 x 2 hr focus groups, for a total of $1500. In all, payment to ALBA totaled $4,500.

Transcription and translation services: Farmers in the Salinas area speak mainly Spanish and, given the graduate student researcher's intermediate Spanish proficiency, a transcription service was hired to transcribe and translate audio recordings. The service provider was compensated at a standard rate of $30/hr for 75 hrs, for a total of $2,250.

Video equipment rental: This project had originally budgeted $500 to cover the cost of video equipment rental from UCSC's Information Technology Services; however, due to the COVID-19 pandemic, I was unable to safely rent this equipment. Remaining funds will be returned to OFRF.

LEVERAGED RESOURCES: I have received multiple sources of funding in order to support the continuation of this project. First, I received a Carbon Fund grant ($4,500) from the UCSC Sustainability Office in order to support costs of doing outreach and sharing findings. Second, I was awarded a Heller Agroecology Graduate Student Research Grant ($2,824) to support undergraduate assistance with developing short outreach videos to showcase farmers' nutrient

management practices. Third, I received a Graduate Research Fellowship ($138,000) from the National Science Foundation in order to support my ongoing doctoral research about agricultural nutrient management practices; this work involves conducting interviews and participant observation with farmers. I will continue to explore opportunities for further support of project objectives.

REFERENCES:

Bernard, H.R., 2017. *Research methods in anthropology: Qualitative and quantitative approaches*. Rowman & Littlefield.

Calo, A. & De Master, K.T. 2016. "After the incubator: Factors impeding land access along the path from farmworker to proprietor." *Journal of Agriculture, Food Systems, and Community Development*.

Corbin, J.M. and Strauss, A., 1990. Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative sociology*, *13*(1), pp.3-21.

Drinkwater, L.E., Schipanski, M., Snapp, S. and Jackson, L.E., 2017. Ecologically based nutrient management. In *Agricultural Systems (Second Edition)* (pp. 203-257).

Emerson, R.M., Fretz, R.I. and Shaw, L.L., 2011. *Writing ethnographic fieldnotes*. University of Chicago Press.

Fageria, N.K., Baligar, V.C. and Bailey, B.A., 2005. Role of cover crops in improving soil and row crop productivity. *Communications in soil science and plant analysis*, *36*(19-20), pp.2733-2757.

Glaser, B. G., & Strauss, A. L. (2017). *Discovery of grounded theory: Strategies for qualitative research*. Routledge.

Guest, G., Namey, E. and McKenna, K., 2017. How many focus groups are enough? Building an evidence base for nonprobability sample sizes. *Field methods*, *29*(1), pp.3-22.

Halberg, N. and Muller, A. eds., 2012. *Organic agriculture for sustainable livelihoods*. Routledge

Harter, T. & Lund, J.R. 2012. "Addressing nitrate in California's drinking water: With a focus on Tulare Lake Basin and Salinas Valley Groundwater." *Report for the State Water Resources Control Board Report to the Legislature*.

Hilton, L.C., 2015. *Case study on organic farming as a sustainable solution for African-American farmers* (Doctoral dissertation, University of Phoenix).

Kumar, K. and Goh, K.M., 1999. Crop residues and management practices: effects on soil quality, soil nitrogen dynamics, crop yield, and nitrogen recovery. In *Advances in agronomy* (Vol. 68, pp. 197-319). Academic Press.

National Sustainable Agriculture Coalition. 2017. Cultivating the Next Generation: An Evaluation of the Beginning Farmer and Rancher Development Program (2009 to 2015). Washington D.C.

National Sustainable Agriculture Coalition. 2018. Outreach and Assistance for Socially Disadvantaged and Veteran Farmers and Ranchers (Section 2501). Available online at: http://sustainableagriculture.net/publications/grassrootsguide/farming-opportunities/socially-disadvantaged-farmers-program/ (verified September 27, 2020).

Pasick, R., Oliva, G., Goldstein, E., Nguyen, T. 2010. Community-engaged research with community-based organizations: A resource manual for UCSF researchers. From the series: UCSF Clinical and Translational Science Institute (CTSI) Resource Manuals and Guides to Community-Engaged Research, P. Fleisher, ed. Published by Clinical Translation Science Institute Community Engagement Program, University of California San Francisco.

Roesch-McNally, G.E., Basche, A.D., Arbuckle, J.G., Tyndall, J.C., Miguez, F.E., Bowman, T. and Clay, R., 2018. The trouble with cover crops: Farmers' experiences with overcoming

barriers to adoption. *Renewable Agriculture and Food Systems*, *33*(4), pp.322-333.
Rosset, P.M. and Altieri, M.A., 1997. Agroecology versus input substitution: a fundamental contradiction of sustainable agriculture. *Society & Natural Resources*, *10*(3), pp.283-295.
United States Department of Agriculture. 2000. National organic program: Final rule. Codified at 7 C.F.R., part 205.
United States Department of Agriculture – National Agriculture Statistics Service. 2012. *Census of Agriculture.*
Wang, T. 2020. Cover crop adoption: Farmers' perceived benefits & barriers.SDSU Extension. Available online at: https://extension.sdstate.edu/cover-crop-adoption-farmers-perceived-benefits-barriers (verified September 27, 2020).
Warr, D.J., 2005. "It was fun... but we don't usually talk about these things": analyzing sociable interaction in focus groups. *Qualitative Inquiry*, *11*(2), pp.200-225.

PHOTOS:

(Image 1) Taking soil samples:

(Image 2) Outside of a local drinking water event where residents discussed the regional nitrate pollution problem:

(Image 3) A sunny day on a diversified organic vegetable farm that has been attempting to use cover crops:

(Image 4) A typical liquid fertilizer used by small-scale organic Latina/o farmers in the region:

(Image 5) The researcher (Peterson) visiting a farmer and their crops in Salinas, CA: