

2018 SUSTAINABILITY REPORT



JV Farms
Organic

MESSAGE FROM VIC & ISRAEL



*JV Farms Organic owners
Vic Smith and Israel Morales*

At JV Farms Organic, we are committed to growing premium quality, fresh ORGANIC leafy greens and vegetables in a SUSTAINABLE way. Keeping an eye on the triple bottom line of People, Planet, and Profit ensures JV Farms Organic is taking care of our people and the community, carefully protecting our precious resources, and producing our fresh organic products in the most efficient and economical way.

The first step was to launch a sustainability program to provide a foundation for establishing a baseline and tracking our progress. We implemented a Waste and Recycling program in 2014 and completed the United Fresh Sustainability Guide and Self-Assessment for Fruit and Vegetable Production to establish a baseline for our sustainability practices. In 2015, we adopted metrics that aligned with the Stewardship Index for Specialty Crops, a suite of on-farm metrics for tracking our progress over time.

At the heart of our organic farming operation is our focus on building soil health and farming practices that are rooted in the Four Soil Health Management Principles set by the US Department of Agriculture's Natural Resources Conservation Service (USDA-NRCS):

- Minimize disturbance
- Maximize soil cover
- Maximize biodiversity
- Maximize presence of living roots

The purpose of this 2018 Sustainability Report is to share the farming practices we have found that produce positive, sustainable, results – it's good for our farms, good for the planet, and supports the success of future generations.

Our kids ARE the future!

Vic Smith

Israel Morales

COVER: Romaine crop on the JV Farms Organic Ranch located on the Central Coast of California.

The circles represent key tools used by JV Farms Organic for growing organic and sustainable leafy greens and vegetables. From left to right: green-waste compost, organic fertilizer, insectary habitat, conservation tillage, irrigation, and cover crops.

CONTENTS

1	Commitment
2	Table of Contents
3	Soil Health Benefits
4	Four Soil Health Principles
5	Soil Building Practices
5	Conservation tillage
5	Cover crop program
7	Compost applications
7	Organic fertilizer
8	Insectary habitat
10	Soil DNA Testing
11	Company Growth
14	The Metrics
16	Energy Use
18	Fertilizer Applied
20	Habitat and Biodiversity
22	Recycling and Waste Management
23	Soil Organic Matter
27	Water Use
29	Looking Ahead
30	References

WHAT IS SUSTAINABILITY?

 *Meeting the needs of the present without compromising the ability of future generations to meet their own needs”*

~ 1987 United Nations Commission

SOIL HEALTH

The Foundation of Farming!



“There is still no agreed upon measurement of healthy soil, but when Israel takes you out to his fields and has you feel it, smell it, and you are able to see the perfect aggregation of it, that is the true measurement. Israel has been advocating and farming for healthy soils for decades and is truly ahead of his time, but now, current research is catching up with what he’s been practicing.”

–Gina Colfer, Wilbur Ellis
PCA/CCA

JV Farms Organic knows from experience that healthy soil is the foundation of a sustainable farming operation. Healthy soil is the home of billions of bacteria, fungi, and other organisms that together form a complex symbiotic ecosystem known as Soil Organic Matter – SOM.

Measuring change in SOM will be discussed in the Metrics section of this report.

Improving soil health provides benefits across the farming operation:

- Reduces the impact of pest and soil borne diseases
- Improves soil tilth – better germination and water infiltration
- Improves ability of soil to hold more water for plants while protecting water quality
- Improves nutrient availability

Together, these add up to ranch resiliency and profitability.

FOUR PRINCIPLES

Israel has been fine-tuning practices that build soil health, based on the USDA Natural Resources Conservation Service's Four Soil Health Principles for over 40 years.

1. Minimize disturbance

Soil microbes are destroyed by too much tillage. We practice conservation tillage with specialized equipment.

2. Maximize soil cover

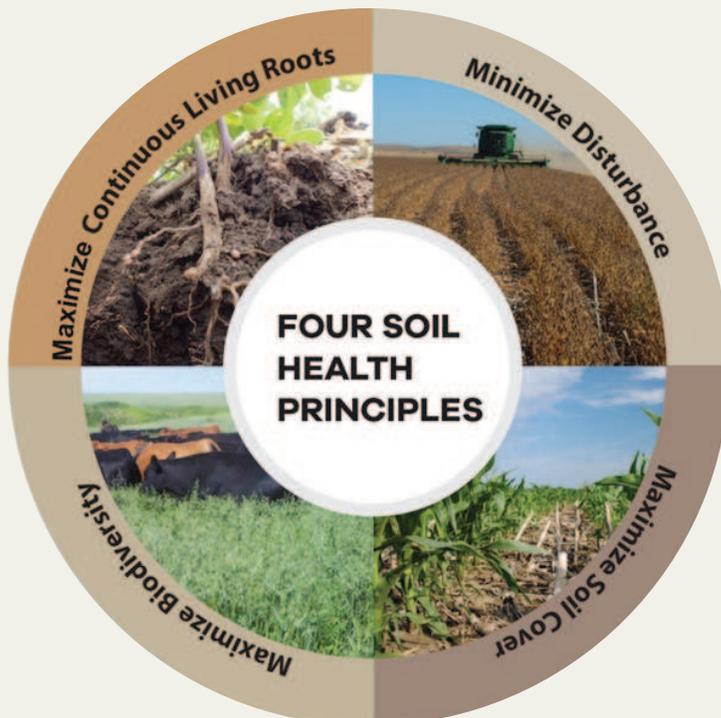
JV Farms Organic plants an annual cover crop to the whole ranch, employs wide beds and high plant populations, and our specialized equipment allows us to reduce turnaround time between crops.

3. Maximize biodiversity

A green-waste compost is applied in the fall and our annual cover crop program increases soil microbial communities. We plant insectary habitat for beneficial insect populations.

4. Maximize presence of living roots

Our practices increase the presence of roots that feed microbes by putting carbon and essential enzymes back into the soil.



Source: USDA NRCS

OUR PRACTICES

JV Farms Organic's time tested-practices that build soil health:



“What is unique, is JV Farms Organics’ extraordinary use of cover crops. Due to economics, most growers in the Salinas Valley rotate a cover crop into their program maybe 1 out of every 5-10 years. Israel has embraced Louise Jackson’s message to focus on soil microbes and has figured out a way to use cover crops in his annual rotation.”

—Richard Smith UCCE
Farm Advisor Monterey
County

Conservation tillage and reverse mulching system

Several decades of trial and error have resulted in the conservation tillage program we use on all our ranches today. Consisting of four pieces of customized equipment, our program minimizes soil disturbance while aerating the soil and reshaping the beds between crops.

- 3-Pt Ripper opens the top of the bed to improve water infiltration and drainage
- 6-Pt Ripper opens and re-shapes the bed
- Breaking Bottoms Bar cleans out and re-establishes the furrow and throws loose dirt on top of the bed
- Reverse Mulcher buries residue from the previous crop down to 12 inches deep and seals the planting bed *We can re-plant immediately—no waiting for residue to breakdown!*

Cover Crop Program

We plant a nutrient-building cover crop to the entire ranch every fall. Taking this kind of care on all our ranches doesn’t slow us down when we’re ready to plant in the Spring thanks to our Reverse Mulcher. Together, our tillage system, reverse mulching, and cover cropping are the keys to building and maintaining critical soil nutrients needed by each crop we grow.

The cover crop adds soil organic matter, feeds the microbes, plus suppresses weeds and disease.

Groundwater is protected by the cover crop as it scavenges nitrogen left in the soil by the last crop of the season. This nitrogen is “banked” for the next growing season. We plant Merced Rye at a rate of 25-30 pounds per acre and monitor the soil nitrogen levels during crop growth with the Nitrate Quick Test. When the cover crop grows to about one foot in height, and we see test results in the 0-10 parts per million range, we mow it down to 4-5 inches.

We then use the reverse mulcher to bury the cover crop 12 inches deep, providing organic matter and food for the microbes, and nitrogen for the next crop.

Cover Crop to 100% of crop land



Following mowing of the cover crop (or harvest of a crop) JV Farms Organic's conservation tillage program includes four key pieces of equipment to minimize soil disturbance and minimize time in between crops.

Photos from top to bottom: the 3-Pt Ripper opening the top of the bed, the 6-Pt Ripper opening and reshaping the bed, the Breaking Bottoms Bar cleaning out the furrows, and the Reverse Mulcher burying crop residue 12" deep and sealing the bed to allow for immediate planting.



Compost Applications

Green-waste compost is applied at a rate of 3-4 tons per acre. The compost adds organic matter and nutrients. Applying fresh compost to moist soil will allow microbes to thrive and multiply. Compost use is another way to support microbial diversity and activity.

Organic Fertilizer

Our repeated use of organic fertilizers such as chicken pellets 4-4-2 provides as much carbon (food for the microbes) as a cover crop. This carbon stimulates and supports microbial growth activity.

“Healthy soil makes healthy plants; healthy plants make healthy people”

–Israel Morales



Green-waste compost is loaded onto a truck to spread on the fields.



Insectary Habitat

Floral diversity is an important component to aiding in the biological control strategy of reducing insect pests in crops. Most adult predatory insects require flower nectar and pollen to reproduce offspring that will continue to be aggressive predators and



Adult syrphid flies keep the beneficial insect cycle going by feeding on flower pollen and nectar maintained at our ranches.



Syrphid fly larvae feeding on aphids. Each larva can eat up to 400 crop-destroying aphids during development.

parasites on pests like thrip and aphid. Working with Gina Colfer of Wilbur Ellis, we will learn what the best habitat may be for these beneficial insects. We will also release *Orius insidiosus* early in the next growing season. *Orius*, also called the minute pirate bug, is an aggressive thrips predator.



“JV Farms Organic is increasing the diversity on all of the ranches with beneficial insectary habitats and wintertime cover crops. With diversity on the ranch, the biological control agents that are predatory and parasitic to insect pests can outcompete and reduce their numbers if the population dynamics are in place. With this diversity, organic insecticide sprays are minimized and biological diversity is thriving.

*–Gina Colfer, Wilbur Ellis
PCA/CCA*



Soil DNA testing

This is a highly specialized technology for measuring soil biological activity. Trace Genomics is helping us build soil health through understanding how beneficial microbes interact and function in the soil. Their technology has the ability to detect soil diseases that may need to be addressed. With the support of Trace Genomics' soil scientists, we are able to track changes in the microbiome (microbial environment of the soil) before and after applying a fungicide, seed treatment, or other products.

Knowing what is going on in the soil confirms that our practices are working.



Report Summary Brassicas

Customer:	Jv Farms
Contact:	Christian Morales
Sampling Date:	13 July 2018
Farm Name:	Jv Organics
Field Name:	Block 17 M, Block 17 N, Block 17 R, Block 17 S

Pathogen Screen Summary

- *Albugo candida*, causative agent of 'White rust', is HIGH in block 17 m, block 17 n, block 17 r and block 17 south.
- *Sclerotinia*, causative agent of 'White Mold', is HIGH in block 17 m, block 17 n, block 17 r and block 17 south.
- *Verticillium dahliae*, causative agent of 'Verticillium wilt', is HIGH in block 17 n.

Microbial Activity Summary

- Microbial Phosphorus Activity, the ability of microorganisms in the soil to solubilize phosphorus and make it available to plants, is LOW in block 17 m and block 17 n.

► Please contact our agronomist for a consultation to provide recommendations based on your preferred management practices.

PAGE 1



Report Summary Lettuce

Customer:	Jv Farms
Contact:	Christian Morales
Sampling Date:	10 April 2018
Farm Name:	Ranch 1, Wilson R.3
Field Name:	Field 44, Lot 12

Pathogen Screen Summary

- Botrytis, causative agent of Botrytis Gray Mold, is HIGH in R1 L12 - Healthy and R1 L12 - Not Healthy.
- Phoma, causative agent of Phoma Basal Rot, is HIGH in R1 L12 - Healthy, R1 L12 - Not Healthy and Wilson R.3 Field 44.
- Pythium, causative agent of Pythium Wilt, is HIGH in R1 L12 - Healthy and R1 L12 - Not Healthy.
- Sclerotinia sclerotiorum, causative agent of Lettuce Drop, is HIGH in R1 L12 - Healthy and Wilson R.3 Field 44.
- Verticillium dahliae, causative agent of Verticillium Wilt, is HIGH in R1 L12 - Healthy and R1 L12 - Not Healthy.

► Please contact our agronomist for a consultation to provide recommendations based on your preferred management practices.

NEED SOME ANSWERS? +1 831-296-0111 / WWW.TRACEGENOMICS.COM PAGE 1



“Israel is one of the most talented farmers that I have worked with. He and his team at JV Farms Organic are setting the bar for organic farmers around the world. They are innovative and creative and select tools that fit their operation’s needs to maximize output potential.”

–Kris Singh, Trace Genomics

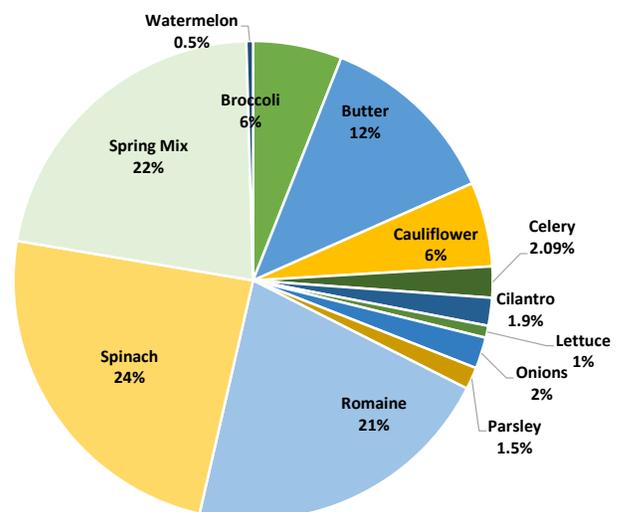
JV Farms Organic is working to maximize soil coverage and increase living roots that increase soil carbon using wide beds with high plant populations.



Machine harvesting spinach leaves to be transported to the salad processing facility for packaging and distribution to retail and foodservice companies.

COMPANY GROWTH

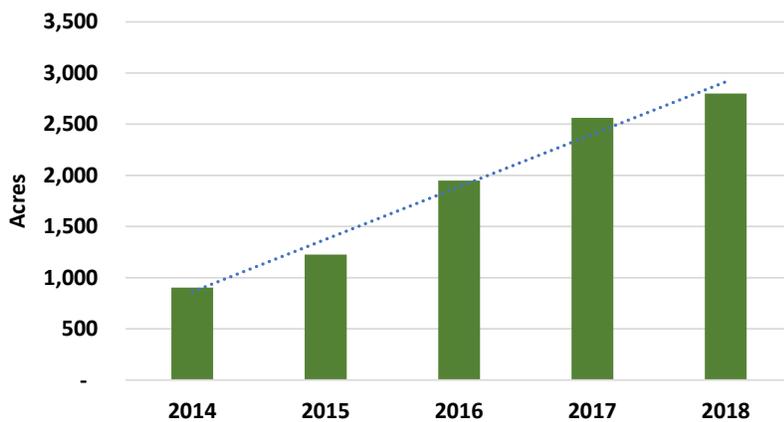
Acreage in farming is most often calculated in "crop acres" i.e., the number of acres planted to a crop each year. Established in 2013, JV Farms Organic has increased in crop acres each year and in 2018 grew 12 different types of leafy greens and vegetables.





Cheryl Penrose, JV Farms Organic Office Manager, is responsible for the business accounting and tracking farm metrics such as plantings, harvest, fertilizer, energy, and water.

2014 - 2018 Acres Planted





THE METRICS

The following metrics have been identified by the Stewardship Index for Specialty Crops, a multi-stakeholder initiative, for measuring and communicating sustainability progress in the produce supply chain.

The JV Farms Organic Sustainability Program adopted these metrics along with Recycling and Waste Management as a valuable means of documenting and measuring change over time within our own operation.



Energy Use



Fertilizer Applied



Habitat and Diversity



Recycling and Waste Management



Soil Organic Matter



Water Use

Israel Morales with Christian Morales, JV Farms Organic San Vicente Ranch Foreman, and the customized conservation tillage equipment. Conservation tillage minimizes soil disturbance and uses less fuel than conventional tillage.



89 passenger cars driven in one year

The greenhouse gas savings by using a Variable Speed Drive on our irrigation pump for the past 3 years

ENERGY USE

There is both an environmental and an economic cost to using energy in farming operations. All forms of non-renewable energy (electricity, diesel, propane, gasoline) can be expensive to purchase and there is a direct link between energy usage and greenhouse gas (GHG) emissions. Energy is used on-farm to pump irrigation water, run the tractors and keep the lights on in the shop and office.

JV Farms Organic tracks all forms of energy used by ranch by month and is working to reduce the amount of energy used throughout the operation whenever possible. Here are three ways we reduce energy use and GHG emissions every day with our farming practices.

Variable Speed Drive Irrigation Pump

In 2015, JV Farms Organic installed an energy efficient variable speed drive (VSD) irrigation pump on the San Vicente Ranch. Since installation, the VSD has enabled JV Farms Organic to save over 600,000 kilowatt hours which is the greenhouse gas equivalent to 89 cars driven in 1 year (US EPA)!

Reducing total amount of irrigation water pumped and used on crops

- Tracking what the crop needs and applying just that amount
- Carefully placing water where and when the crop roots can use it most efficiently

Building water holding capacity in the soil

- Healthy soil structure uses all inputs, including water, more effectively
- Water applied to healthy soil moves evenly through the field for better germination
- Conservation tillage prevents soil compaction and minimizes fuel use

A Variable Speed Drive on an irrigation pump controls input frequency and voltage allowing pump performance and speed to be adjusted. By controlling the speed of the electric motor, the operator can slow the speed of the pump, reducing output (gallons per minute) and saving electricity. VSDs also conserve electricity by allowing for slow or "soft" starts of the motor.

JVFO reduced the energy used for electricity by 8% and diesel fuel by 10% per crop acre in 2018.



FERTILIZER APPLIED

*Being good stewards of the land, JV Farms Organic understands the importance of using the right type of **organic** fertilizer, the right **amount** of fertilizer, in the right **place** and at the right **time** (the 4 R's) to ensure crop needs are satisfied while protecting the environment.*



Christian Morales, taking a soil sample for a Nitrate Quick Test to measure the amount of nitrogen present in the soil. Understanding how much nitrogen is currently available to the plant is an important component of making fertilizer decisions.

The key practices we employ in our operation to optimize fertilizer applications include:

- Nitrate Quick Testing to measure the available nitrogen at pre-plant, at mid-season, and at harvest helps us to match our fertilizer applications to crop needs.
- An organic pelleted chicken manure is the main source of Nitrogen, which contains approximately 29% carbon, thus adding carbon with each fertilization.
- A liquid microbial stimulant is applied after crop establishment to encourage microbial activity and increase the efficiency of nitrogen mineralization from the fertilizer.
- Winter Cover Crop roots locate and pull up nitrogen from the last crop that would have been lost and leached down to groundwater. That nitrogen is then “banked” in the cover crop until it gets incorporated back into the soil for the next crop.

92 Pounds of Nitrogen

The average amount of nitrogen stored per acre of JVFO cover crop for use on the following crop (Richard Smith UCCE 2017)

Customized equipment applies pelleted chicken manure (4-4-2) adding both nitrogen and carbon, food for the plants and soil microbes.



HABITAT AND BIODIVERSITY

The Stewardship Index for Specialty Crops developed this metric to indirectly measure on-farm habitat and biodiversity and infer its benefits for ecology on the farm.

***Habitat** refers to the micro-environments critical to support a thriving community of soil organisms.*

***Biodiversity** here means the variety and health of those soil organisms. Ecosystem health depends upon good and improving habitat and biodiversity.*

This SISC metric documents and tracks on-farm conservation practices and measures the areal extent of on-farm habitat associated with positive biodiversity results. Habitat and biodiversity can be tracked over time, by growers like JV Farms Organic, using a set of on-farm practices that work in their operation.

JV Farms Organic completed a baseline SISC assessment and identified the following practices currently in use to increase habitat and biodiversity on our ranches:

- Conservation tillage
- Cover crops
- Compost applications
- Insectary habitat
- Organic fertilizer
- Organic-Certified Crop Protection Products
- Owl Boxes help stabilize the eco-system by equalizing the predator to prey ratio.

JV Farms Organic increases habitat and biodiversity with plantings of insectary habitat to provide nectar and pollen for beneficial insects, and conservation tillage including the reverse mulcher shown here. The reverse mulcher buries the crop residue 12" deep and allows us to re-plant immediately, feeding and protecting soil organisms by minimizing soil disturbance while maximizing soil cover.



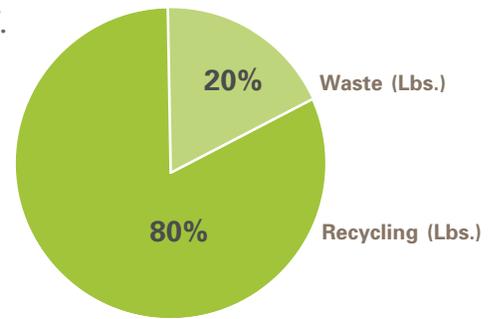
Owl box made of a recycled seed bucket provides a place for owls to nest on the ranch. Owls help to keep crop damaging rodents in check.



RECYCLING AND WASTE MANAGEMENT

JV Farms Organic has long been an active advocate for reducing, reusing, and recycling materials that would otherwise add to the local landfill. When materials (paperboard, glass, some plastics) are recycled, they are diverted from a landfill. Landfills not only cause pollution to the environment by contaminating the groundwater and soil but are a source of methane, a powerful greenhouse gas.

Approximately 80% of the waste materials generated on our farm are recycled. Since 2014, the JV Farms Organic recycling program has diverted over 170,000 pounds of waste from the landfill.



JVFO 2018 Waste Stream

2014 to Date: 174,468 total pounds diverted from landfills.

2018	41,811
2017	41,805
2016	42,612
2015	41,808
2014	6,432

Separating recyclable materials such as pallet straps from waste on the ranch helps to reduce the amount of materials that would end up in the local landfill.

SOIL ORGANIC MATTER

Soil Organic Matter (SOM) is considered the most important metric for measuring soil health by the SISC Committee.

This annual cover crop adds soil organic matter, feeds the microbes and suppresses weed and disease.

SOM is the ecologically rich portion of soil that works all the magic, building a healthy soil foundation for farming. The organic matter content of soil is small, varying from 1 to 6% by weight in typical well-drained soils (Brady, 1984). But its influence on soil health and plant growth is much greater.

SOM holds nutrients and absorbs water so that plants can thrive. It must be patiently nurtured and grown just like our crops. Composed mostly of carbon (55%), up to 5-6% nitrogen, and about 1% of each phosphorus and sulfur, the formation of SOM is important for storing these nutrients (Smith et al. 2011).



Building soil organic matter is a slow, intentional process and it can be decreased with the physical disturbance and mixing of soil through conventional tillage (Brady, 1984; Six et al. 1999).

Fertilizing with organic pelleted chicken manure, JV Farms Organic adds as much soil organic matter as planting a cover crop.



These facts make SOM a good measure of our soil health practices. JVFO practices are designed to minimize soil disturbance and let the billions of soil organisms go to work for us!

When SOM increases, these are the results:

- Soil tilth, aeration, and drainage improve
- Water & nutrient holding capacity improve
- Soil becomes both a reservoir and a source of critical plant nutrients

JV Farms Organic strives to protect, build and maintain Soil Organic Matter with these practices:

- Cover crops
- Compost applications
- Conservation tillage
- Organic fertilizer such as chicken pellets (4-4-2)

We will track the benefit of this suite of practices by measuring SOM % for each ranch over time.

The SISC metric can also be used to compare the relative effectiveness of these farming practices by applying a *Soil Management Assessment Framework*.

Each 1 percent increase in soil organic matter helps soil hold 20,000 gallons more water per acre.

~ USDA NRCS

A compost truck drives across a field where the cover crop was just mowed down. Compost adds organic matter and is applied in the fall either before or after mowing the cover crop. It is important to keep the compost moist and not let it dry out to keep the microbes alive.





Permanent set sprinkler systems help JV Farms Organic keep crop yield and quality high while conserving water resources.

WATER USE

Water is a precious resource. We have implemented soil building practices and programs to conserve the amount of water we use and protect water quality leaving our fields to surface water (rivers and streams), and groundwater.

All of JV Farms Organic's ranches use groundwater for irrigation. Most fields have permanent sprinkler systems in place significantly minimizing set-up time and maintenance issues.



A single operator can manage all the irrigation on a ranch and still have time and attention to anticipate, prevent, and solve other problems. This type of irrigation system is ideal for keeping crop yield and crop quality high while conserving water resources.

Permanent set sprinkler systems provide many benefits to our vegetable and leafy green farming operation:

- Better product quality
- Can be used to reduce and control mildew and thrip damage
- Better placement control
- Apply water only where you want it
- Saves on labor & reduces logistical issues
- No moving of sprinkler pipe & drip tape

LOOKING AHEAD

As we continue to learn and refine our practices year after year, here are some things we look forward to in 2019:

Conservation Tillage

- Modify the seed bed design, keeping all tillage within the bed. This will establish a track for the equipment and eliminate soil compaction on the beds.

Biodiversity & Habitat

- Increase Oxygen and Carbon levels in the soil allowing us to further reduce inputs such as water and fertilizer.
- Encourage owls to nest on every ranch by installing owl boxes. Owls are efficient hunters that prey on small rodents. Providing a place to nest helps to stabilize the eco-system by equalizing the predator to prey ratio.
- Experiment with the design and density of the insectary habitat plantings to learn what the best habitat is for the beneficial insects.

Soil DNA testing

- Improve beneficial microbial activity in low production areas on the farm. We will start by identifying low yielding lots and look at the historical data. We can then select management practices that target and support beneficial microbes.
- Conduct disease suppression trials with soil DNA testing. When disease is detected in the field, we will pull soil core samples and perform diagnostic testing. We will then spot treat using biological products to suppress the disease.
- We will work to reduce input costs using soil biological data.

Israel Morales, Israel Morales Jr., and Christian Morales. Three generations dedicated to organic, sustainable farming, and sharing their knowledge with generations to come.



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