Traditional Hawaiian Farming with Modern-Day Business Planning

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Hawaiʻi is home to a set of staple starch crops unique to the Pacific, including taro (kalo), breadfruit (ʻulu), sweet potato (ʻuala), banana or plantain (maiʻa), and yam (uhi). These highly nutritious, culturally important crops provide both sustenance and income for a growing number of farming families. Native Hawaiians used a sophisticated lunar/celestial calendar, in conjunction with a rich and varied complex of soil and water management practices, as well as a range of crop varieties for specific ecosystems and elevations, to produce an abundance of high quality food in the Islands. Place-based agricultural systems such as this are developed through keen, multi-generational observations. They continue to be relevant and challenge us to cultivate greater skills as farmers.

Hawaii State Archives Photograph Collection PP-44-14-003-0001. H-329 Taro Field. Hawaii.

One thing we can learn from those who farmed before us in the Islands is that farming was systematic and the system worked. A great deal of planning and forethought went into where, when, and how each crop would be planted and grown. The amount of daylight, water, and drainage needed for each crop, care of the soil, what the harvest would be used for, when and how much was needed, was all figured into the system. Both lunar and celestial cycles guided agricultural decision-making. Today, we see a movement to return to a system where the lunar calendar guides our planting and the ahapuaʻa provides a model for how our resources should be used. The Hawaiian lunar, or moon (mahina), calendar adapts easily to the present as a tool to select the best days to plant for optimal growth and productivity.

If your goal is to make a living as a farmer, you also need to know how to run a successful business. The key to any successful business, including farming, is planning. Business Plans are developed in order to create a cohesive vision and roadmap for operations and finances. There are several keys aspects to that planning process. This bulletin, a joint effort by E kūpaku ka ʻāina and the Molokaʻi Cooperative Extension Services, is intended to give an overview of these components, and an example of a farm that utilizes both traditional methods of planting and growing using the Hawaiian lunar calendar and other agricultural practices, as well as modern-day business planning.

- A **Business Plan** is a decision making tool which states your goals, why you want to achieve them, and lays out how you plan to achieve them. It is a living document, which simply means it is a work in progress. The plan serves as your roadmap to your farm goals and if you find you need to change directions, you simply adjust the plan and proceed. This document is important in helping your business work through many challenges on paper, before implementing what might otherwise be a costly lesson in real life.

  A **farm business plan** specifically targets the crop(s) you want to grow and numbers associated with bringing that crop to harvest (soil inputs, seeds, supplies and equipment, irrigation system, water, etc.) that together make up the cost of production. It lays out the goals of production, including yield, quality, varieties, as well as the estimated costs of each step in the production process, and the costs of connecting your produce to your buyers (processing, packaging, delivery).
- **Farm Map** can be an aerial photo or aerial (bird's eye view) drawing of your farm with fields or plots labeled by number or name. If you have access to the internet, you can often find an aerial view of your farm through online sites such as Google Maps or the Real Property Tax office for your county (choose satellite image).
- **Production Plan**. This document is key to getting production inputs and strategies as accurate and closely aligned with your market goals as possible on paper before implementing in the field. It gives you the opportunity to work out many of the human capital (labor) and seasonal (water, weeds, pests) related issues that can come up in farming, and can help you avoid being overwhelmed, overworked, or making costly sacrifices.
- **Production Map** unlike a physical map like the Field Map, this is actually a spreadsheet that helps a farmer predict labor needs, as well as, predict your production costs, and helps determine if you can meet the demand for the market(s) you have chosen. For instance, if your market is asking for 500lbs of taro per month and you work a full time job, can you, alone, plant enough rows to provide 500lbs of taro per month for 12 months and beyond? This "map" helps calculate each step of the process; including, preplant field preparation (cultivation, cover crops, tillage of cover crops, incorporating soil amendments), estimating seed and propagation needs, coordinating timing and labor for planting, weeding, insect and disease observation and management, irrigation, fertilizing, selection, harvesting, and rotating seed (in this case, huli) to the next field. By putting this down on paper it allows you to work through any issues that might arrise prior to implementation. If you don't think you can plant every month and complete all the tasks on your production map, then perhaps, you can adjust planting to every other month and work with another farmer (producer) to plant on the alternate months and together you can meet the market demands.

- **Field plot plan or layout** is exactly that – a physical map of your fields or plots; in this case with an overlay of the moon phase(s)/dates when planting will occur and an estimate of harvest dates.
- **Succession Planting** is the practice of maximizing the productivity of your garden, field, or loʻi by having a new patch or an additional row (line) ready to plant as soon as or just before an earlier crop or planting is harvested.
- **Timed or Staggered Planting** refers to the intentional staggering of crop planting dates to manage the labor intensity, market demand or to spread out the length of harvest over a given period of time rather than planting your entire crop at one time. With the proper staggering or timing of planting dates, you can potentially have a steady harvest providing for a constant market supply.

Both succession and staggered plantings should include time for fallowing your field so the soil can rest and replenish. Constant planting can lead to severely depleted soils and overall poor soil quality.

The Hawaiian lunar calendar is a good tool for developing a staggered or succession planting schedule. For example, to meet your market you will likely need to plant once or twice a month. The day (lunar night) you choose to plant still gives you flexibility at harvest time just like any other date you might select. The Hawaiian moon calendar indicates that Māhealani, the full moon, is the best day to plant many crops, but especially taro. Old time farmers also liked the Akua moon for its high energy. There are many other good nights for planting kalo, including Kū nights and the anahulu (a period of ten nights) of Poepoe, which includes the full moon and the Laʻāu nights.

Let's look at an example of a Production Map for a short term crop, such as ʻuala (sweet potato).

Table 1. Production Map Example with Succession Planting for a Short-Term Crop (ʼUala – Sweet Potato)

Crop: ʻUala												
	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Jan
Field #												
1	LP	I	PL	IF/H	SI	HV	FA	CR	CR	CR	CR	LP
2		LP	I	PL	IF/H	SI	HV	FA	CR	CR	CR	CR
3			LP	I	PL	IF/H	SI	HV	FA	CR	CR	CR
4							LP	I	PL	IF/H	SI	HV

Note: Fall planted ʻuala typically has a lower yield per acre. In this example, the rotation is 6 months.

Legend for all Tables:

LP= Land Preparation
R=Ripping
P=Plowing
D=Discing
T=Rototill

F= Fertilization
LM=Liming
PF=Preplant fertilizer

PL= Planting
SS=Sidedressing
IF=Inject Fertilizer
IN=Insect
H=Herbicide
CW=Cultivate Weeds

H= Hilling
SI= Stop Irrigation
CR= Crop Rotation

I=Install Irrigation
M=Mainline
S=Submain
L=Lateral

HV=Harvesting
WP=Washing Packing
T=Transport
Mk=Marketing

FA= Fallow
O=Observation
M=Maintain
CC=Cover Crop

Note: Fertilizers may refer to either traditional Hawaiian soil amendments, organic, or chemical inputs. Two or more actions have a / between them. In Table 2, double letter codes appear vertical due to space limitations. Unused codes in the legend are examples of more detail a farmer might need to plan.

Table 2. Production Map Example with Succession Planting for a Long-Term Crop (Dryland Kalo - Taro)

Crop: Dryland Taro																								
	Year 1												Year 2											
Field /Row #	J	F	M	A	M	J	Jy	A	S	O	N	D	J	F	M	A	M	J	Jy	A	S	O	N	D
1	LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA									CC	CC	CC
2		LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA									CC	CC
3			LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA									CC
4				LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA								
5					LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA							
6						LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA						
7							LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA					
8								LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA				
9									LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA			
10										LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA		
11											LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA	
12												LP	I	PL	IF	CW	CW	IF	CW	CW	IF	CW	HV	FA

* Weed mat was installed between rows after planting.

In this Dryland Taro Example, the work and expenses begin in January of Year 1 and you should not expect to see income (unless from leaf production) until about November or December of Year 1, or January of Year 2. The extended fallow period for commercial dryland producers is four years for heavy nematode infested areas. Because most producers do not have the resources to have a four-year rotation, this example shows a one year rotation ending the fallow period with three months of cover crop to break the cycle and prepare the ground for the Year 3 planting. This example also shows you will need another field to carry out a long-term planting rotation or you will need to lessen your fallow period which could have major implications in dryland production if nematode damage has been seen in the previous crop cycle. If you have limited space, dividing into four fields will allow for a four-year rotation, just with less annual production.

Zooming in to a four-month section of the above Production Plan, here's an example of how to apply the Hawaiian moon calendar to your Plan. There are a number of lunar phases good for planting kalo. In this case, we chose Kūlua, Māhealani and Kāne. This gives the farmer between 7-12 days between plantings to space out work.

Table 3. Portion of a Production Map Example with Succession Planting for a Long Term Crop (Dryland Taro) by Lunar Phases

Crop: Dryland Taro												
	Jan			Feb			Mar			April		
Moon phase	Kūlua	Māhe a-lani	Kāne	Kūlua	Māhe a-lani	Kāne	Kūlua	Māhe a-lani	Kāne	Kūlua	Māhea -lani	Kāne
Field/ Row #												
1	LP	I	PL	CW	CW	CW	CW	CW	CW	IF	CW	CW
2		LP	I	PL	CW	CW	CW	CW	CW	CW	IF	CW
3			LP	I	PL	CW	CW	CW	CW	CW	CW	IF
4				LP	I	PL	CW	CW	CW	CW	CW	CW
5					LP	I	PL	CW	CW	CW	CW	CW
6						LP	I	PL	CW	CW	CW	CW
7							LP	I	PL	CW	CW	CW
8								LP	I	PL	CW	CW
9									LP	I	PL	CW
10										LP	I	PL
11											LP	I
12												LP

EKKA-Molokaʻi CES Lunar Response in Kalo field trials, Hoʻolehua (Aug 2019).

As the cost of conventional agriculture inputs continues to rise, a variety of strategies will help with production, including knowledge and tools that we can learn from the past. For the skilled farmer, the application of traditional lunar/celestial (seasonal) planting practices is a no-cost, sustainable option with the capacity to improve both yields and product quality. Production planning is a modern tool that can be adapted to include such traditions, as well as, conventional or modern methods of farming to result in an economically viable subsistence or commercial farm.

Helpful tools for farmers:

- Prince Kuhio Hawaiian Civic Club Ancient Hawaiian Moon Calendar.
- NOAA Weather App allows you to check humidity, wind, rainfall and upcoming weather.
- Moʻolelo mahina planner (moolelomahina.com) is an example of a practical field calendar notebook based on the Hawaiian moon phases. A good tool if you don't use your phone to collect data. One advantage - it becomes a long-term record of your plantings, harvests, weather, etc. to look back on.
- Homaikapono.org (Hō Mai Ka Pono) has daily mahina posts, online classes and workshops. Moon phases don't always occur on the same day or Hawaiian months in the same order across the islands due to changes in latitude. There are moon phase planners for each island.
- Skyview app for iPhones or android phones shows you the constellations in the night sky wherever you are and can help you observe the changing seasons marked by the rise and set of the stars.

For more information contact E kūpaku ka ʻāina or the CTAHR Molokai CES Office:

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