

## Integrating Small Goat Herd Production with Fruits and Vegetable Production

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Most small family farms produce and market more than a single crop from their farm. Growing multiple crops promotes benefits coming from both biologic and economic diversification. Biological diversity of living things, both plant and animal, many that we cannot see help suppress the development of a domineering species in a farming system. Domineering species of plant and animal in a crop production system can be one that can cause great crop losses. By growing diversity of crops, it will create biological environment that will support and sustain many living thing and will promote a biological balanced growing environment. Economic benefits from growing diversity of crops come from opportunities to offer customers or market more than 1 crop. This is especially beneficial when marketing products at a farmer market or engage in supplying other families with fresh food products in a community support agriculture marketing strategy. The farm will not solely dependent on a single commodity for its cash flow, but rather create opportunities for developing several revenue streams, a business strategy that has been well tested and implemented by many business enterprises.

There are many examples of farms capturing the benefits of diversification by growing multiple numbers of crops. But there are only a few examples of creating diversification by integrating and capturing the benefits of existing livestock enterprise of a farm with the crop production enterprise.

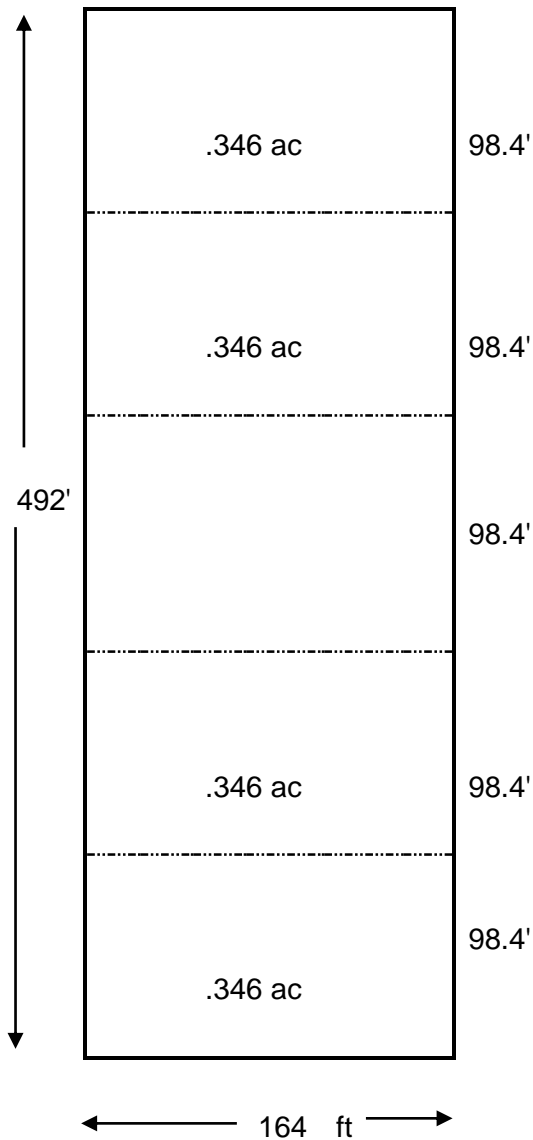
The purpose of this project is to develop a diversified production system by integrating the farm's goat production enterprise into a crop production enterprise, where both goats and crops benefits from each other. In the project a herd of 12 goats was used to clear fallowed land covered with grass, brush and woody plants and used to eat residue crops after harvest. After goat clear vegetation off the land, soil was prepared using a garden tiller and fruits and vegetable crops were produced. The projected benefits for using the existing goat enterprise included

1. Sustaining both the biological and economic diversity of the farm.
2. Reduce the petroleum cost and foot print of the farm operation.
3. Optimize the use of existing farm resources by integrating them in a single farm system
4. Through the goat's digestive system, they converted vegetative raw material into organic matter to feed soil micro-organisms.

### **Planning and Designing Portable Goat Containment**

One of the greatest concerns and fears of keeping goats close to crops is the potential of them escaping from the containment and causing crop damage. In an integrated system goat can easy turn from a benefit to plant pest. Effective containment is the key for keeping goats and crop separated from each other. Containment need to be cost effective also. Permanent woven wire fence is probably the most effective barrier for keep goat and crops separated. However at an estimated cost of more than \$2.25 per linear foot it would be cost prohibitive alternative. For the project electric goat net fence was used. The net fence cost \$.70 per linear foot. The greatest advantage of using an electric net fence containment system is its portability that allows it to be moved easily to other sites that need to be cleared by the goats, thus the initial cost is spread to more land area. While the cost of permanent fence would be allocated to the acre it is constructed on.

The containment area was designed to with a perimeter fence and 4 cross net fence that created 5 paddock for the managing the goat herd. Each paddock was .346 acres.



It was estimated that there was 4000 pounds per acre of forage for the goats and it would take the herd of 12 goats 66 days to consume the 1-acre of forage. In 2010 the goat herd adequately cleared 5 acres of land over a 9 month period, thus taking 54 days to consume 1-acre of vegetation material. The estimated land clearing and preparation saving contributed by the goats was \$450 to \$500 dollars per acre.

### Cropping On Land Cleared by the Goats

In keeping with food safety standards, crops production followed the 120 day withdrawal period after livestock removal to crop harvest rule. Land after goat grazing was rototilled using a garden tiller. Tilling was made easier by applying moisture to the soil. Only plant rows were tilled. For the ease of project recordkeeping each crop was planted in a 1/100 acre, 4356 square feet, increment plot. Soil amendments and fertilizer were added to the soil according to soil analysis recommendations. Coral lime and dolomite were added to correct soil pH and magnesium deficiencies. Fruits and vegetable crops were successfully produced in the plots.



Data on Yield (lbs) per Increment (1/100 of acre) and Estimate Yield per Acre

Crop	1	2	3	4	5	Average Yield per Increment	Estimated Yield per Acre
Leaf Lettuce	280	245	302	210	175	242.4	24240
Eggplant	480	320	410	350	250	362	36200
Green Beans	70	55	64	48	65	60.4	6040
Watermelon	220	198	184	256	177	207	20700
Taro	180	220	347	187	192	225.2	22520
Edamame	62	78	45	94	73	70.4	7040
Papaya	450					450	45000
Banana newly planted							

All crop yields were comparable with commercial production yield standards.



Crops produced were marketed at the Kaunakakai Saturday open market.



The project successfully demonstrated that integrating the livestock unit of the farm with the fruits and vegetable farm enterprises can be accomplished and contribute to cost savings in land clearing and preparation for crop production. The key to the integration is keeping both separated with good barriers. Electric net fences were used in the project. Goats are sensitive to electric pulse of the fence. Fence maintenance and good grounding are required to make fence work effectively. The portability that allows it to be reused on other lands needed to be cleared makes the fence affordable.



Field day participants get hands-on experience in installing the electric net fence during a field day gives participants confidence in the technology. Some have adopted the net fence technology on their farm.

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