

Status of Oceanic Institute's Pilot Research Feed Mill

**DOA/OI Feeds Round-up
August 15, 2012**

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Knowledge of the Sea Ka'ike O Ke Kai

The Hawaii Feed Trap

- Feed is 60-70% of livestock production costs*
- All feed is imported
- Cost dependent on outside market forces

– Ingredient Prices

- 142% increase in corn prices from 2001-2011
 - 2001 (~\$123/MT)
 - 2011 (~\$298/MT)

– Shipping Costs

- 50% increase in Matson charges + THC (2004) from 2001-2010
- Is ~ 30% of cost landed



*USDA, ERS, "Farm Income and Costs: 2008
Farm Sector Income Forecast"

Impact of Feed Prices on Hawaii's Livestock Industry

2001

Sector	Feed (tons)	Value (\$Million)	\$/ton
Beef cattle*	8,000	2.06	257
Dairy*	31,000	12.50	403
Swine*	36,600	4.54	124
Poultry (all)*	31,000	8.10	261
Aquaculture*	1,800	1.30	722
Total	108,400	28.5	263

2008

Sector	Feed (tons)	Value (\$Million)	\$/ton
Beef cattle*	8,700	6.29	650(85%) roughage 970(15%)concentrate
Dairy*	12,587	10.38	825
Swine*	7,132	5.14	720
Poultry (layers)*	15,848	8.16	515
Aquaculture*	1,671	2.36	1,650
Total	45,938	32.3	703

Potential for Animal Production In Hawaii

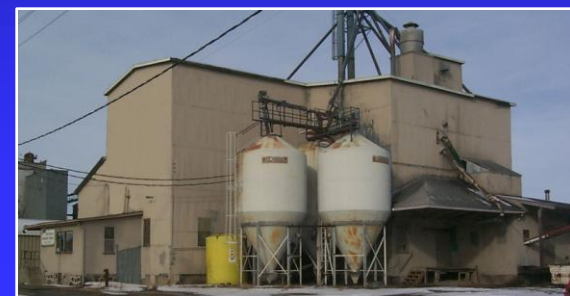
Year	Reference year						RATIO	PARITY
	1960	1970	1980	1990	2000	2010		
State Population	632,772	769,913	964,691	1,108,229	1,211,537	1,360,301	1.77	1,360,301
January 1 inventory Cattle & Calves	169,900	246,000	213,000	205,000	164,000	151,000	0.61	434,639
Steer & Heifer price (cents/lb live wt.)	NA	22.50	49.40	44.50	44.30	60.00	2.67	
Cow price (cent/lb live wt.)	NA	16.20	42.50	34.30	27.40	53.90	3.33	
January 1 inventory milk cows	13,080	13,000	13,000	11,000	7,000	1,800	0.14	22,969
Avg. milk farm gate price (\$/100 lbs)	NA	\$9.29	\$18.12	\$20.70	\$24.50	\$35.00	3.77	
Hogs/Pigs Dec. 1 inventory prior yr.	59,000	58,000	57,000	36,000	26,000	12,500	0.22	102,476
All hog (cents/lb live weight)	31.70	38.90	69.80	79.40	79.30	97.60	2.51	
Number of layers December 1 prior yr.	655,000	951,000	1,007,000	992,000	609,000	336,000	0.35	1,680,250
Egg farm price per dozen (cents)	60.10	51.40	75.70	85.00	89.00	151.00	2.94	
Farm grown finfish price per pound	NA	NA	NA	NA	6.45	5.41		
Farm grown shellfish price per pound	NA	NA	NA	NA	5.18	7.50		

1/ Table 1 Series HI State Data Center (DBEDT)

All other rows' source from Statistics of Hawaii Agriculture

History of Feed Milling in Hawaii

- **Waldon Feed Co.* (1902 - 1993)**
 - Successful 100,000 ton operation until 1993
 - **All local feed production (mostly Oahu)**
 - Primarily poultry, swine
 - Some horse and specialty feeds
 - Up to 100 tons shrimp feed/month
 - High quality feed was competitive edge
 - **Imported most ingredients**
 - Carnation milling (1929) controlled ingredient prices until 1982
 - **Real savings made in reducing transportation costs**
 - Business collapse
 - **IHHNV at shrimp farms in 1980's**
 - **Leveraged buy-out of Carnation mills in 1989**
 - **Iniki effects (1992)**
 - Loss of key clients on Kauai, Waianae
 - Young Brothers increased rates by 20%



History of Feed Milling in Hawaii

- **Waldon Feed Co. (1902 - 1993)**
 - Going Forward
 - **Margins**
 - Low for cattle (5%)
 - High for specialty feeds (25-50%)
 - Medicated feeds critical/need certification
 - **Risk issues**
 - High costs of interisland shipping (key!)
 - High electrical costs
 - High benefit rates of employees



* Dick Stephen-Hassard
President (1979-1993)

Benefits of Local Feed Development

- Price controlled by internal market forces
- Ensures supply & quality
- Potential export
 - Livestock
 - Specialty feeds
- Promotes sustainability
 - New crops
 - By-, Co-, & waste products



Fishery cuttings

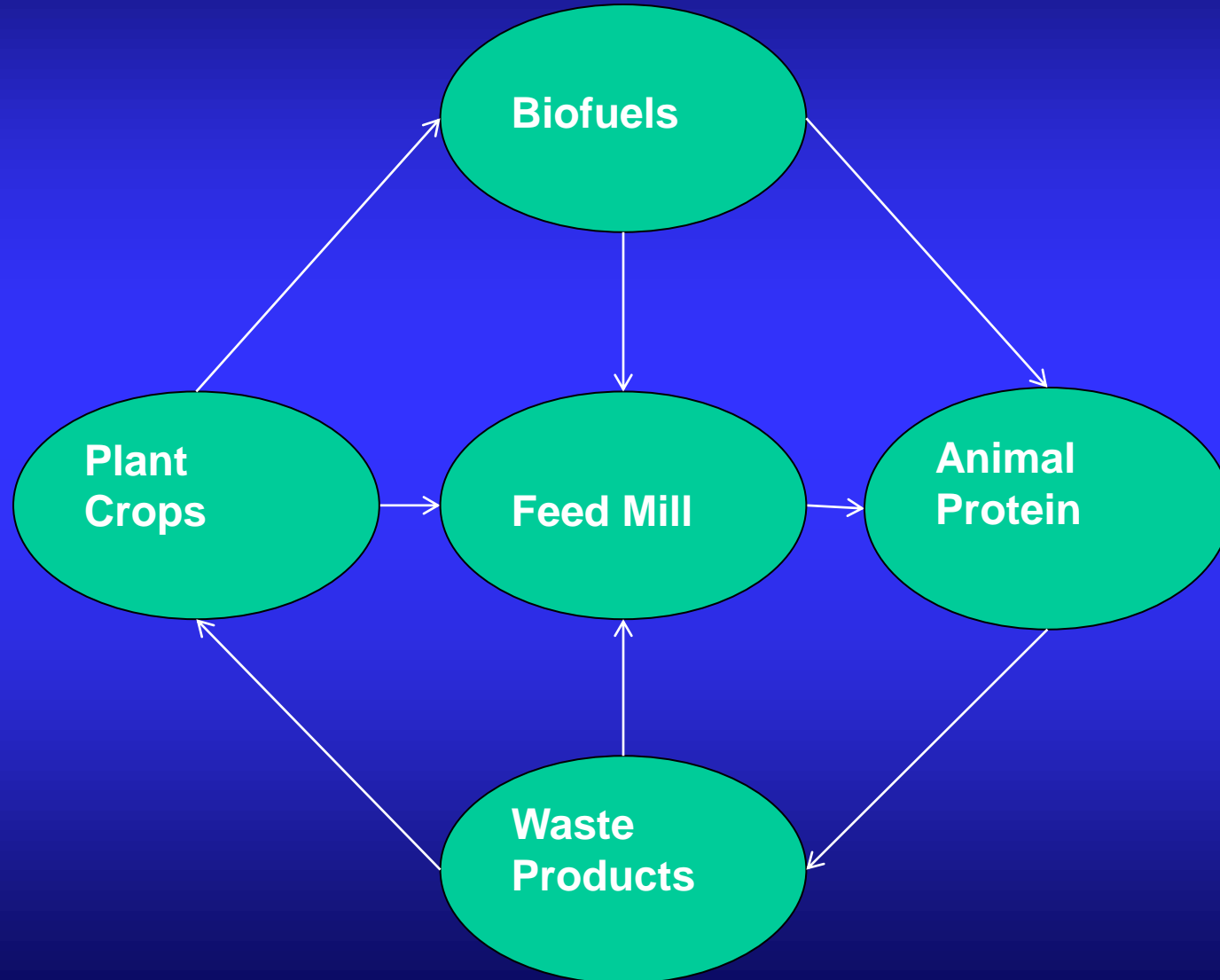


Biofuels protein



Waste sugars

Green Feed, Fuel, & Food Economy (Sustainable Development)



Potential Co-Products

2010

By-Product	Tons	\$/ton
Meat & Bone meal	1,200	250
Soybean hulls	300	200
Wheat mill run	5,000	146
Spent fruit fly waste	520	100
Molasses	50,161	155
Sugar cane leaves	60,000	33
Pineapple skins	No longer available	N/A
Off-grade papayas	3,150	TBD
Boiler ash	N/A	N/A
Fisheries Waste (est.- wet)	4,200	TBD
Algae protein (biofuels)	TBD	TBD
Total	124,531	

USDA National Agriculture Statistics Service, Hawaii Annual Statistics Bulletin, 2010 and The State of Hawaii Data Book, DBEDT, 2010; Personal communication (Lytha Conquest OI) with the Hawaii Agriculture Grower's Association for the major farming industries, Hawaii individual companies, and agricultural distributors, 2010); United Fishing Agency, Honolulu Fish Company, Hawaii Seafood Council (2011).

Oceanic Institute Research Feed Mill



- Not a commercial mill
- Does produce commercial quantities for testing
- Proof-of-concept to attract a commercial mill
- Test ingredients & diets
- Interaction between nutrition & processing
- Model for isolated regions

Ol Research Capabilities

Processing Capability	Oahu Mill	Hilo Mill
Hammer mill	75 kg/hr	3,000 kg/hr @ 420 microns
Mixer	300 kg/hr @ 20 min mixing time	4,000 kg/hr @ 3 min mixing time
Pellet mill	5–10 kg/hr	1,500–4,000 kg/hr
Meat grinder	1-2 kg/hr	
Dry extruder	200 kg/hr	650–1,250 kg/hr
Wet extruder	100-500 kg/hr	100–500 kg/hr
Dryer	1,500-4,000 kg/hr	1,500–4,000 kg/hr
Fat coater	N/A	2,000 kg/hr @ 6 min coating time

Funding Status

- All federal construction funds obligated (\$1.7M)
- Most matching funds in-hand (\$1.21M/\$1.45M)
- All equipment in-hand and in storage (\$1.7M)
- Long-term lease at UH-Hilo Panaewa farm site
- USDA approval for both aquatic & terrestrial animal feeds R&D
- Business plan approved by OI BOD

Construction Timeline

- Negotiate Fees for Design* May 2012
- **USDA Approval of Design Fees** June 2012
- Restart design process July 2012
- **Complete Prelim (60%) Design Submittal** October 2012
- Preliminary Design Review Complete October 2012
- **Draft Supplemental EIS** December 2012
- Pre-Final (90%) Design Submittal December 2012
- **Pre-Final Design Review Complete** January 2013
- Final Design Complete March 2013
- **Final Supplemental EIS** April 2013
- Building Permit Review Complete September 2013
- **Bidding** November 2013
- Request USDA approval of Construction contract December 2013
- **Receive USDA approval of Construction contract** January 2014
- Start Construction March 2014
- **Complete Construction** March 2015



Mahalo
from
Oceanic Institute

