Understanding Operating Practices and Decision-Making Preferences of NW Arkansas Cow-calf Producers

Clayton Weyl[a], Dr. Michael Popp[b], Dr. Jennie Popp[b], and Dr. Ken Coffey[a]

[a] Undergraduate Honors student and Professor, Department of Animal Science

[b] Professors, Department of Agricultural Economics and Agribusiness

Introduction:

- Farmers face increasing economic & social pressure to make sustainable decisions.
- The Forage and Cattle Planner (FORCAP) decision-support software has the capacity to simulate the environmental and economic impact of farm decisions.
- FORCAP is not currently used widely by producers in NW Arkansas.
- How producers use decision tools of this nature has not been studied extensively.

Objectives:

- Interview several diverse cow-calf operations to assess how a variety of operating conditions can be modeled using FORCAP.
- Collect feedback from producers regarding:
  i) strengths and weaknesses of FORCAP
  ii) what features to modify and how
  iii) likelihood of tool adoption

Methods:

The researchers interviewed five farm operations with the following differentiating characteristics.

Description\Farmer	1	2	3	4	5
Years of Experience	35	3	2	43	5
# of cows exposed	400	15	50	100	27
Comm. vs. Purebred	C	C	C	C	P
# of enterprises	3	1	2	1	2
Pasture acres	1,000	27	220	220	40
Hay acres	600	18	80	40	0

Figure 1. Profiles of the 5 producers interviewed.

- To understand the farmers' goals and decision-making processes qualitative questions were asked.
- After the initial interview, farm characteristic were entered in FORCAP and two alternative production practices were identified.
- The FORCAP tool was then presented to producers to showcase decision tool features and the two alternatives.
- Following the demonstration, farmer feedback was collected to meet study objectives.

Description\Farmer	1	2	3	4	5
Default Returns	$12,484	($945)	($6,081)	($19,615)	$84
Alternative Returns	$119,641	$1,711	$4,438	$11,108	$4,550
Default GHG	24.27	15.31	11.15	15.91	23.68
Alternative GHG	16.31	14.87	11.93	15.64	16.17

Figure 2. The table displays FORCAP estimates of net returns to management and land, and net GHG emissions (lbs. CO_2/lb. of liveweight sold) before and after applying the proposed alternative scenario for each farm operation. Hay and fertilizer prices used were farm specific or 10-yr averages if not specified. A description of alternatives included are described to the right.

Herd Size and Description	Bench Mark	Press OK for Our Defaults Based on Your Farm Options or Enter your own to the right	Your Farm (includes impact of extra cattle)
Cows	125	... the age ratio of cows depends on the no. of calves over a cow's life OR specify. Reset	360
Young Cows	25		40
Cow herd size	150	OK	400
Replacement	27	... based on young cows and cow death losses. You can override to grow/shrink herd. Reset	200
Herd Sires	6	... based on 'Bull Estimator'	17
Calves Sold			
Male	62	... based on calf losses, 50/50 steer/heifer calf ratio, replacements retained, cow losses and average herd sire culling age as listed in the 'Bull Estimator' Reset	181
Female (you buy replacements if negative)	35		-19
Cull cows	25		40
No. of years between bull purchases	0.67		0.24
Death losses			
Cows	2		4
Calves	4		11

Figure 3. Limitation 1: Replacement Heifers

- As a default, FORCAP estimates replacement heifer needs to raise on farm to keep the cow herd size constant.
- Producers who do not want to raise their own replacement heifers but instead wish to purchase replacement heifers can only do so by growing the herd. This impacts net returns and GHG emissions estimates as replacements raised on farm require feed, pasture and create emissions.
- Producers who want to compare buying replacements to raising their own would like to see this feature added to FORCAP.

Hay Waste with feeding & storage	OK	12%
Hay produced (from hay & pasture acres in bales)		144
Hay fed (in bales -- accounts for waste)		976
Number of 800 lb. round bales sold (bought if negative)		-832
Pasture acres per cow	... bench mark changes with fertilizer option (Farm), modify on your farm by selecting a different cow herd size	2.2

Figure 4. Limitation 2: Hay Feeding

- Pictured is an example of FORCAP's hay feeding approximation.
- FORCAP assumes that you always feed to animal TDN requirements. The estimation above displays hay produced on farm, the amount of hay that must be fed, and the number of bales of hay bought or sold.
- Four producers wanted to edit these numbers; producer 1 feeds excess hay to his animals to make sure that they get enough nutrition in winter; and producer 4 allows for some amount of body condition to be lost in the winter.

This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2018-38640-28417 through the Southern Sustainable Agriculture Research and Education program, under sub-award number SUB00002012 / LS19-317. USDA is an equal opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.

SARE

UofA DIVISION OF AGRICULTURE RESEARCH & EXTENSION University of Arkansas System

FORCAP FORAGE & CATTLE PLANNER

USDA National Institute of Food and Agriculture U.S. DEPARTMENT OF AGRICULTURE

Alternative Scenario Simulations:

- Alternative scenarios all changed grazing management from continuous to rotational grazing.
- Additionally, each alternative practiced strip grazing, and stockpiling forage.
- All alternative farm scenarios, except for farmer 3's, included planting a winter annual.
- Farm 1's alternative also reduced fertilizer use to a level that produced just enough hay for animals so as not to sell excess hay.
- All scenarios except for Farm 1's switched to a fall-calving season for increased returns.

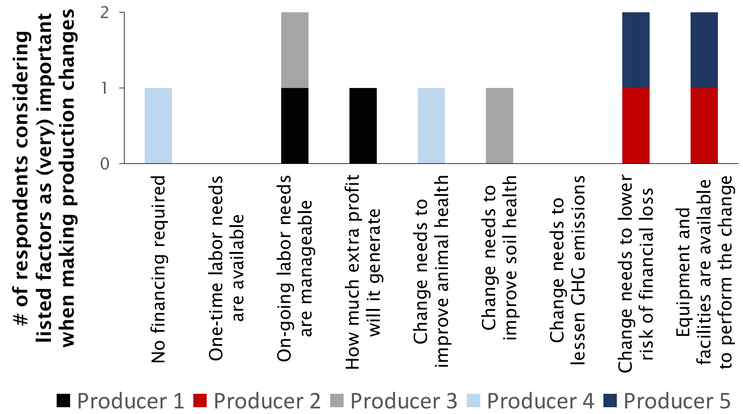

Figure 5. Factors valued as important to producers when considering a change in production practices.

- All producers ranked GHG emissions as least important.
- Except for Producer 1, all were interested in using FORCAP to simulate different decisions for their enterprise. Learning how to use the tool was the hurdle for time-strapped Producer 1.

Results:

- Choosing grazing and forage management strategies other than continuous grazing almost always improved estimated environmental and economic sustainability, despite the initial investment in fence infrastructure. Also, labor is not tracked in FORCAP.
- With current ecosystems markets only rewarding soil carbon sequestration, producer incentives to manage overall net GHG emissions are not inclusive. For example, a producer may add fertilizer to increase soil C sequestration due to greater root biomass growth, but attendant other GHG emissions from greater stocking rate and fertilizer application emissions would raise net GHG emissions per lb. of live weight produced. More climate smart programs are needed.
- Two producers provided accounting data. They commented that the budget approximations from FORCAP were close in comparison.
- Notwithstanding the highlighted limitations, producer interest in decision-aids like FORCAP exists. Greater ease of use and awareness are a hurdle.