Lessons Learned from a Producer Competition: Comparing Technical & Economic Efficiency of Agricultural Performance

Lixia H. Lambert
Department of Agricultural Economics
Oklahoma State University
Email: lixia.lambert@okstate.edu

Hannah E. Shear
Department of Agricultural Economics
Oklahoma State University
Email: hshear@okstate.edu

Jason Warren
Department of Plant and Soil Sciences
Email: jason.warren@okstate.edu

Selected Poster prepared for presentation at the 2022 Agricultural & Applied Economics Association Annual Meeting, Anaheim, CA; July 31-August 2

Lessons Learned From a Producer Competition: Comparing Technical & Economic Efficiency

Lixia H. Lambert, Hannah E. Shear, Jason Warren
Oklahoma State University

Introduction

- The root of farm management is making decisions. Decisions involving inputs and outputs, resource allocation, risk management strategies, and more.
- Producers, in theory, make decisions that are "optimal" or profit maximizing, but in application, producers are not always making optimal decisions.
- Over the last 20 years, more than 150,000 farms have been lost, or exited the market. A large part of this exit is due to highly variable net farm income.
- **The production of agricultural commodities is by nature, a competition. The output (the crop) is homogeneous, therefore producers are "competing" to be the most efficient in order to remain in the market.**

Data and Method

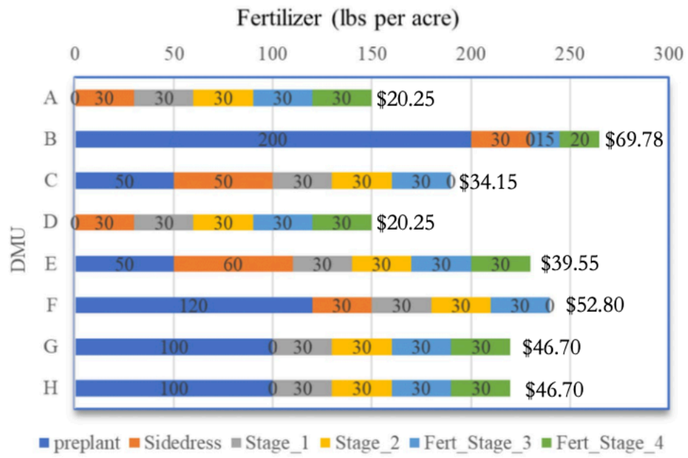
- Eight "farm teams", or decision making units (DMUs), were given 1.2 acres in Eva, Oklahoma on which they would "compete" to earn recognition for the most profitable farm, the most efficient farm, and the farm with the highest yield.
- All DMUs grew irrigated corn, but made decisions regarding crop insurance, irrigation rate, nitrogen application, strip-till N, P, S, and Zn fertilizer, and grain marketing. OSU personnel carried out all decisions made by the DMUs.
- Technical (TE), cost (CE) and profit (PE) efficiency scores were estimated using Data Envelopment Analysis (DEA).

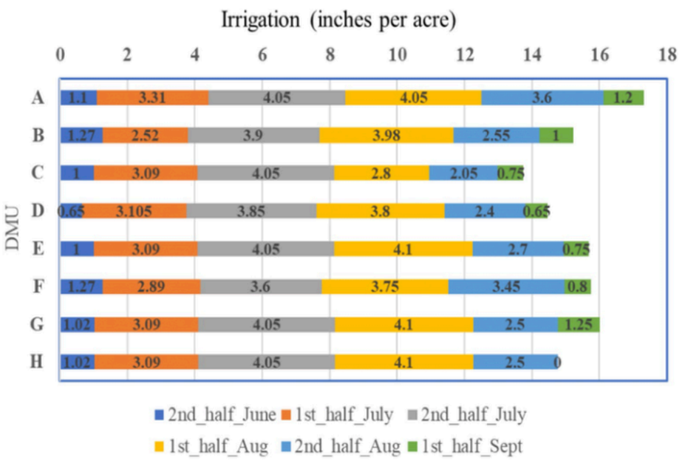
Results and Conclusion

INPUT PRICES

Items	unit	2019
Anhydrous Ammonia 82%	$ per lb	0.305
UAN32	$ per lb	0.135
Irrigation	$ per inch	6

TEAM INPUT DECISIONS





MARKETING RESULTS

Team	Price Received *($/bu)*
A	4.64
B	3.99
C	3.93
D	4.24
E	3.93
F	3.93
G	3.93
H	3.93

OUTPUT RESULTS

Team	Yield *(bu/acre)*
A	207
B	192
C	152
D	87
E	192
F	174
G	187
H	182

EFFICIENCY SCORES

Technical Efficiency

All teams were technically efficient under VRS, with only Farm D not being efficient under CRS.

Cost Efficiency

Farm A & D First Place (1.0)
Farm C Second Place (0.997)
Farm E Third Place (0.912)

Profit Efficiency

Farm A First Place (1.0)
Farm E Second Place (0.901)
Farm B Third Place (0.862)

KEY TAKEAWAY

Focusing on cost minimization within fertilizer application is the most direct way to improve cost efficiency, profit efficiency, and overall technical efficiency. Market price has lesser impact on overall efficiency results.

DEPARTMENT OF AGRICULTURAL ECONOMICS