

## Agricultural Economics and Policy: Practical #3

February 11, 2016

A family farm has 625 acres available for planting. The family plants corn, wheat and oats. It is anticipated that 2,000 acre-feet of water will be available for irrigation, and the farmer is able to devote 600 hours of his own and those of hired workers for the crops. Additional data are as follows:

Requirements per Acre	Crop		
	Corn	Wheat	Oats
Irrigation (acre-ft)	3.0	1.0	1.5
Labor (person-hrs/week)	0.8	0.2	0.3
Yield (bu/ac)	120	45	60
Price (\$/bu)	2.79	3.38	3.43
Average cost (\$/ac)	65.00	48.00	44.50

1. Assuming no other information is available, find the amount of each crop that should be planted for maximum profit. What are the shadow prices of land, water and labor?
2. Double the amount of available irrigation water and labor. What are the shadow prices of land, water and labor?
3. Retaining the higher levels of water and labor availability, suppose we observe 400 acres planted to corn, 125 acres to wheat and the remaining 100 acres to oats. Calibrate the model so that the original objective function is replaced by a nonlinear one that duplicates the observed plantings.