Policy Experiments for the Intermountain West Native Seed Industry

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Wyoming is a significant producer of oil, natural gas, and coal. Reclaiming lands after energy extraction can be a challenge, especially in the fragile and harsh climate conditions often present in the Intermountain West, including Wyoming. Land managers increasingly turn to native rather than introduced plant materials for reclamation efforts, as the former may provide greater long-term reclamation success and ecological function. The Gold Book², which provides a regulatory overview for reclamation on federal lands—including those managed by the U.S. Bureau of Land Management (BLM)—and on private surface lands over federal minerals, specifically identifies native seeds as part of the due diligence expected from oil and gas firms. Native seed, however, is not always used in reclamation, in part due to lack of availability. Also, production costs for native seed are generally higher than those for conventional agricultural crops, and yields are more variable. Both factors tend to discourage producer participation in the native seed market.

BLM is responsible for regulating reclamation efforts on the federal lands that it manages in the West, including those in Wyoming. The agency is, consequently, interested in securing a consistent seed supply and decreasing risk for seed producers (Figure 1 [Indian ricegrass as an example of native forage]). BLM is currently considering two policy options to encourage native seed production. First is forward contracting. Most native grass seed is currently bought and sold on a spot market, meaning that production occurs in advance of trading and seed producers bear the risk that their inventory is not sold. Under forward contracting, producers have a contract in place with buyers before they begin production, which encourages higher production levels. The BLM has already funded small-scale forward contracting to encourage new cultivar development and could expand this policy. Second is demand variability. A major driver of demand for native seed is restoration after wildfire; consequently, BLM’s demand for native seed varies markedly from year to year. BLM is considering smoothing its demand for native seed, at least for those species that can be stored. Further, BLM accounts for between 65% and 90% of market demand for native seed—depending on the fire year—through a biannual consolidated seed buy. How are outcomes affected by the “big buyer” nature of the market?

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Objectives
The objective is to examine whether forward contracting and/or reducing demand variability in the native seed industry would increase seed price and volume traded, and improve the net revenues of seed producers.

Materials and Methods
Lack of real-world data makes a study of the native seed industry using conventional economic analysis difficult. We instead implement a laboratory market experiment to explore how different policy options might affect market efficiency, price, transaction volume, and seller earnings. Students in a computer laboratory trade native seeds in a private negotiation trading environment, with forward or spot deliveries, and constant or variable demand. At the conclusion of the session, student earnings are converted from the laboratory currency of “tokens” to U.S. dollars. Students are compensated according to how wisely they buy and sell native seeds. Most laboratory market experiments use students as subjects due to ready access to the subject pool and convenience in recruiting. Student decision-making might not be representative of producer decisions; however, there is still benefit in testing policies first in the laboratory before implementing them, at potentially great cost, in the real world.

Results and Discussion
Results indicate that both forward contracting and smoothing variable demand increase volume traded, seed price, and net revenues of seed producers. Forward contracting, though, increases efficiency, volume traded, and net revenues more than smoothing demand (Table 1). If BLM signed forward contracts with producers and smoothed its demand for native seeds, efficiency would increase further, nearly to the price and volume levels we would expect to see in a competitive market (thus compensating for the effects of market power). These laboratory results suggest that there may be benefits to implementing such policies in the real world.

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Table 1. Benefits from forward contracting and demand smoothing relative to current market situation.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Earnings*</th>
<th>Improvement over current market situation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big buyer, spot contracts, variable demand</td>
<td>800</td>
<td>0</td>
</tr>
<tr>
<td>Big buyer, spot contracts, constant demand</td>
<td>883</td>
<td>29</td>
</tr>
<tr>
<td>Big buyer, forward contracts, variable demand</td>
<td>997</td>
<td>69</td>
</tr>
<tr>
<td>Big buyer, forward contracts, constant demand</td>
<td>1047</td>
<td>87</td>
</tr>
<tr>
<td>Competitive market, forward contracts, constant demand</td>
<td>1083</td>
<td>100</td>
</tr>
</tbody>
</table>

*Earnings for all treatments are different from the current market situation at p<0.05.