

Adoption of BMPs for Animal Manure Management

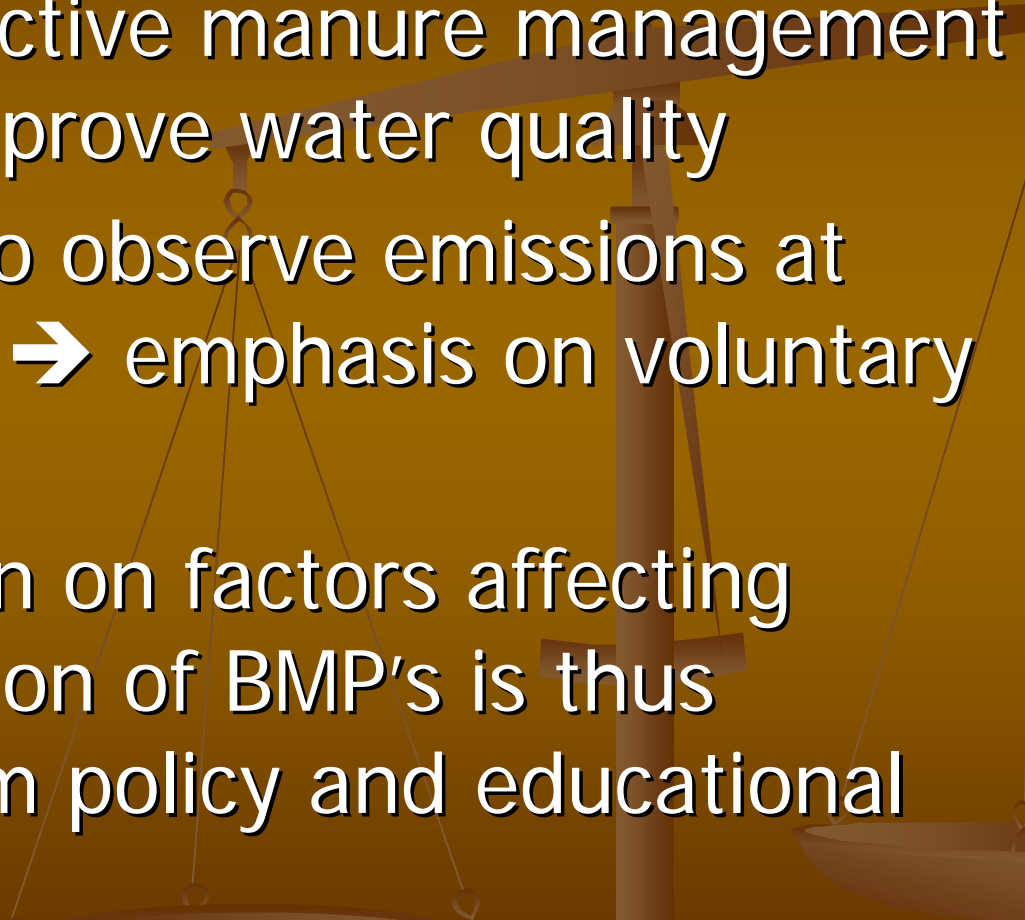


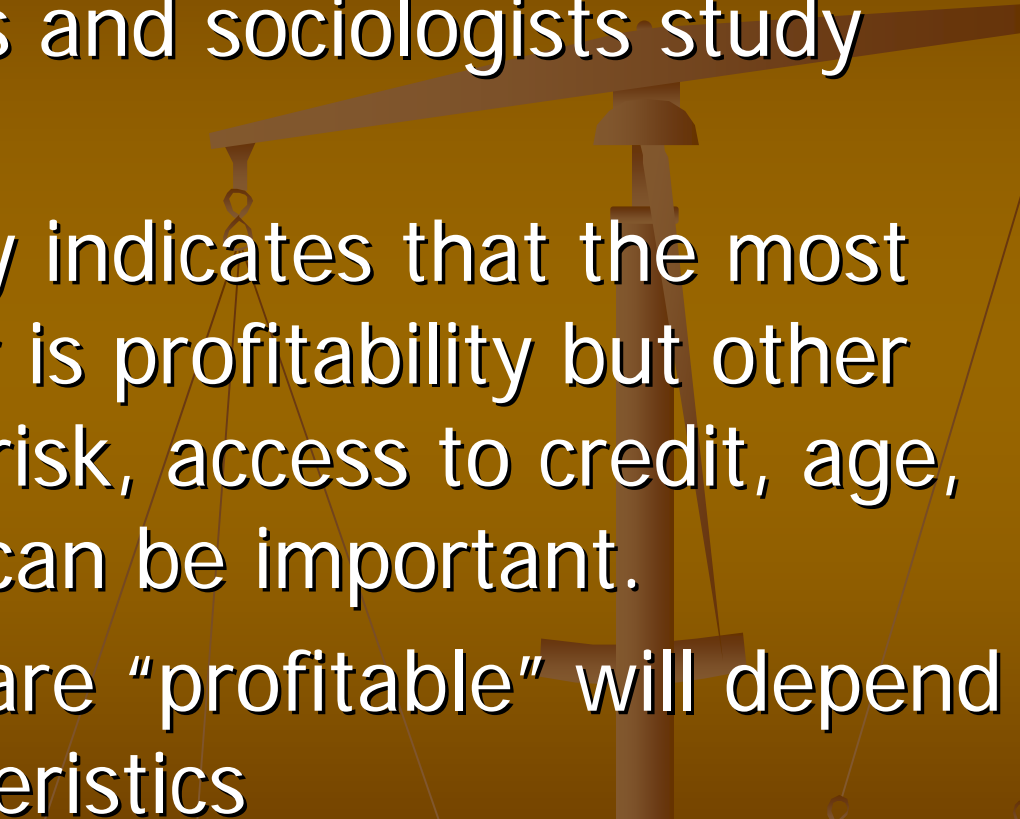
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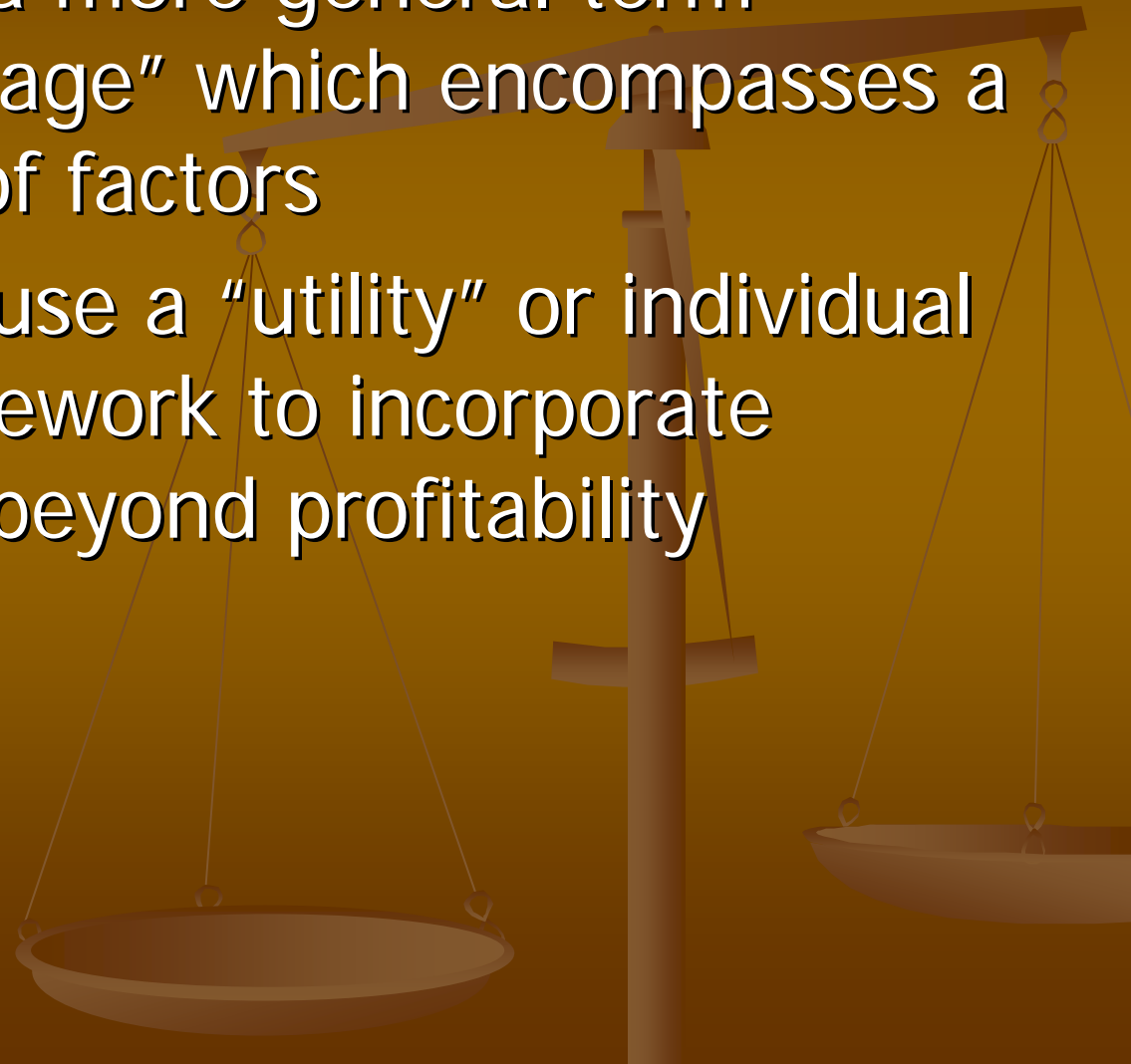
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Motivation

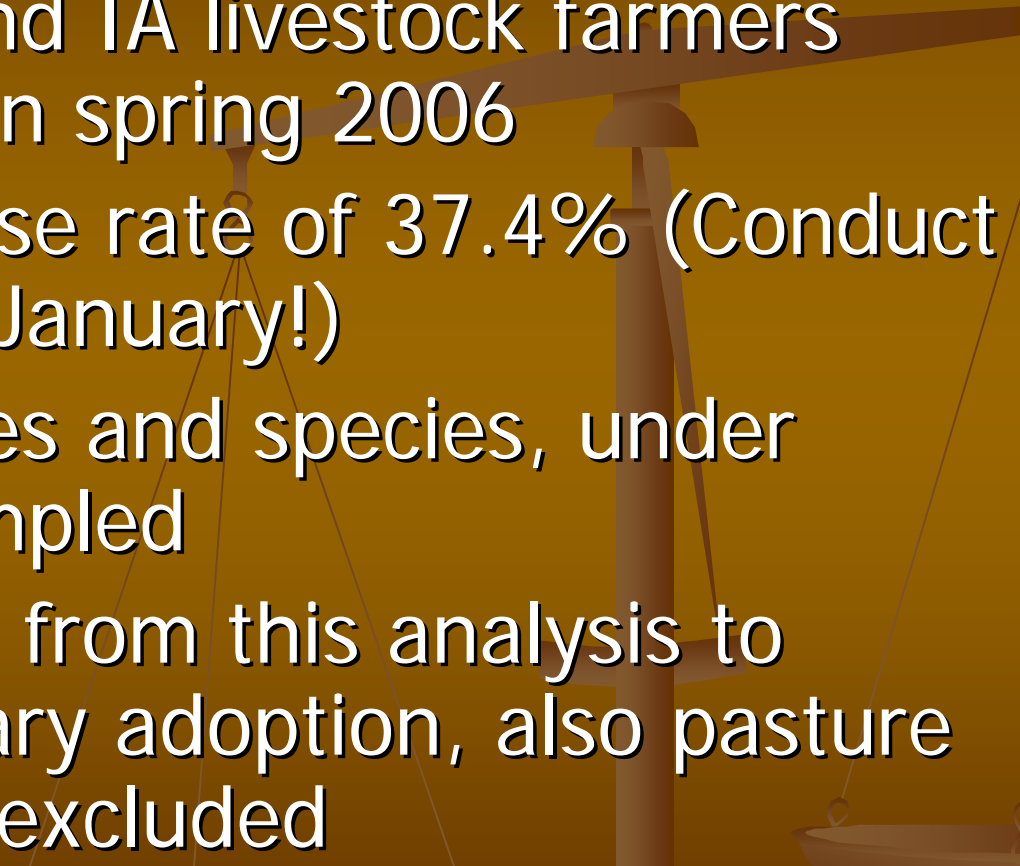
- Adoption of effective manure management practices can improve water quality
 - NPS – inability to observe emissions at reasonable cost → emphasis on voluntary adoption
 - More information on factors affecting voluntary adoption of BMP's is thus needed to inform policy and educational efforts
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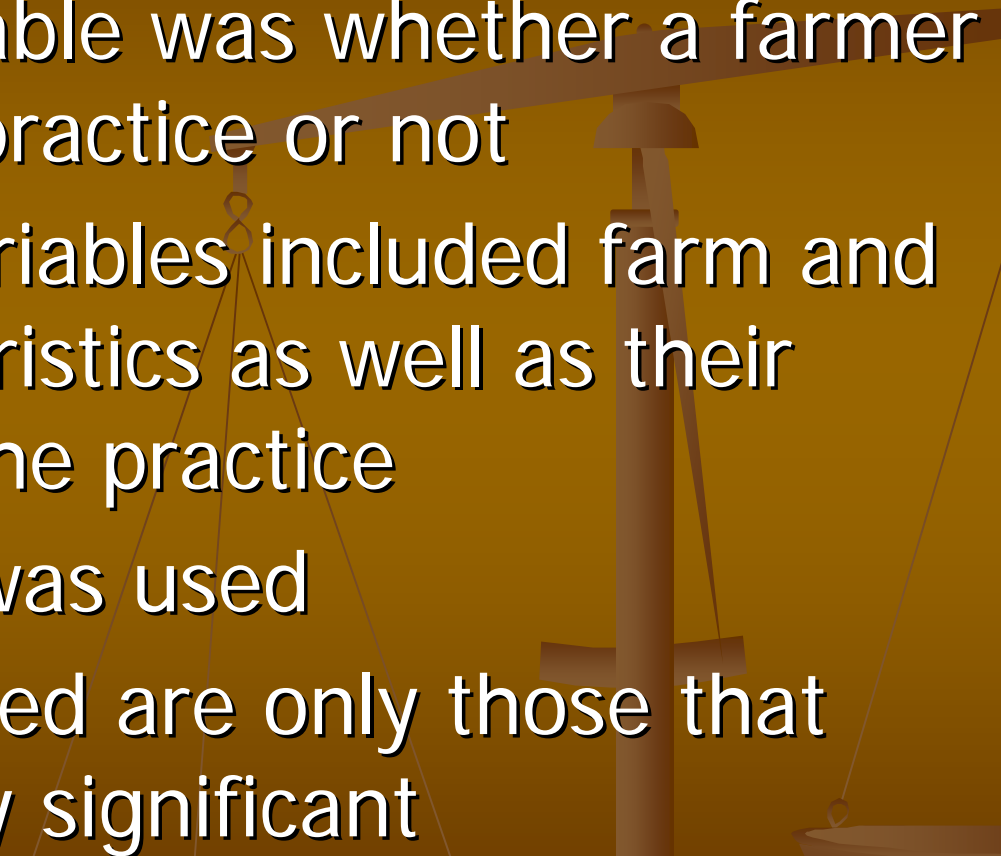
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- Both economists and sociologists study adoption
 - Economic theory indicates that the most important factor is profitability but other factors such as risk, access to credit, age, education, etc. can be important.
 - What practices are “profitable” will depend on farm characteristics

- Sociology uses a more general term “relative advantage” which encompasses a broader range of factors
- Economics can use a “utility” or individual well-being framework to incorporate factors that go beyond profitability



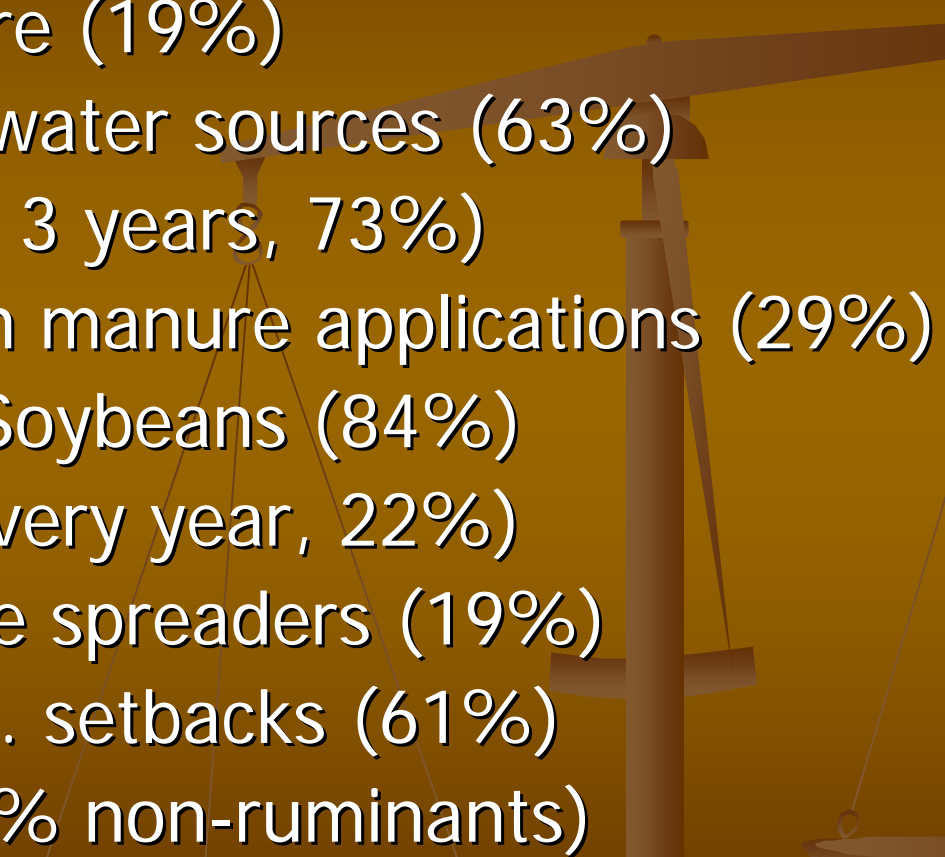
Methods

- Survey of MO and IA livestock farmers was conducted in spring 2006
 - Effective response rate of 37.4% (Conduct your surveys in January!)
 - Stratified by sales and species, under \$10,000 not sampled
 - CAFOs excluded from this analysis to focus on voluntary adoption, also pasture only operations excluded
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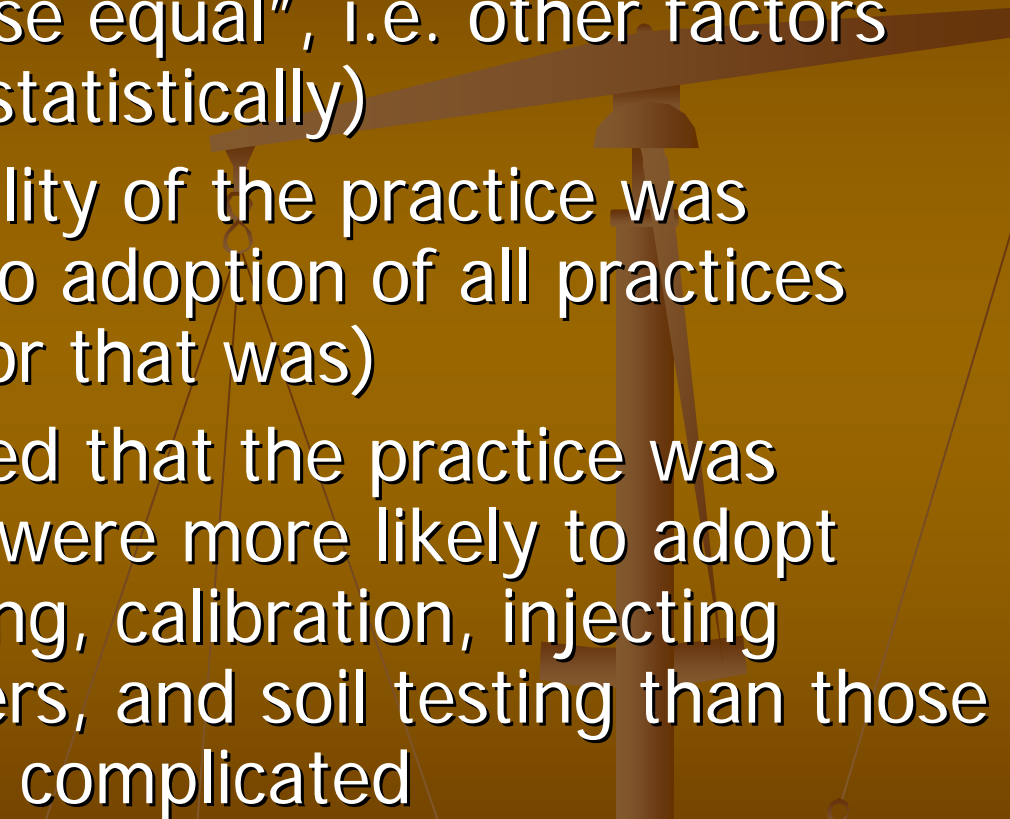
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- Dependent variable was whether a farmer had adopted a practice or not
 - Independent variables included farm and farmer characteristics as well as their perceptions of the practice
 - Probit analysis was used
 - Factors mentioned are only those that were statistically significant

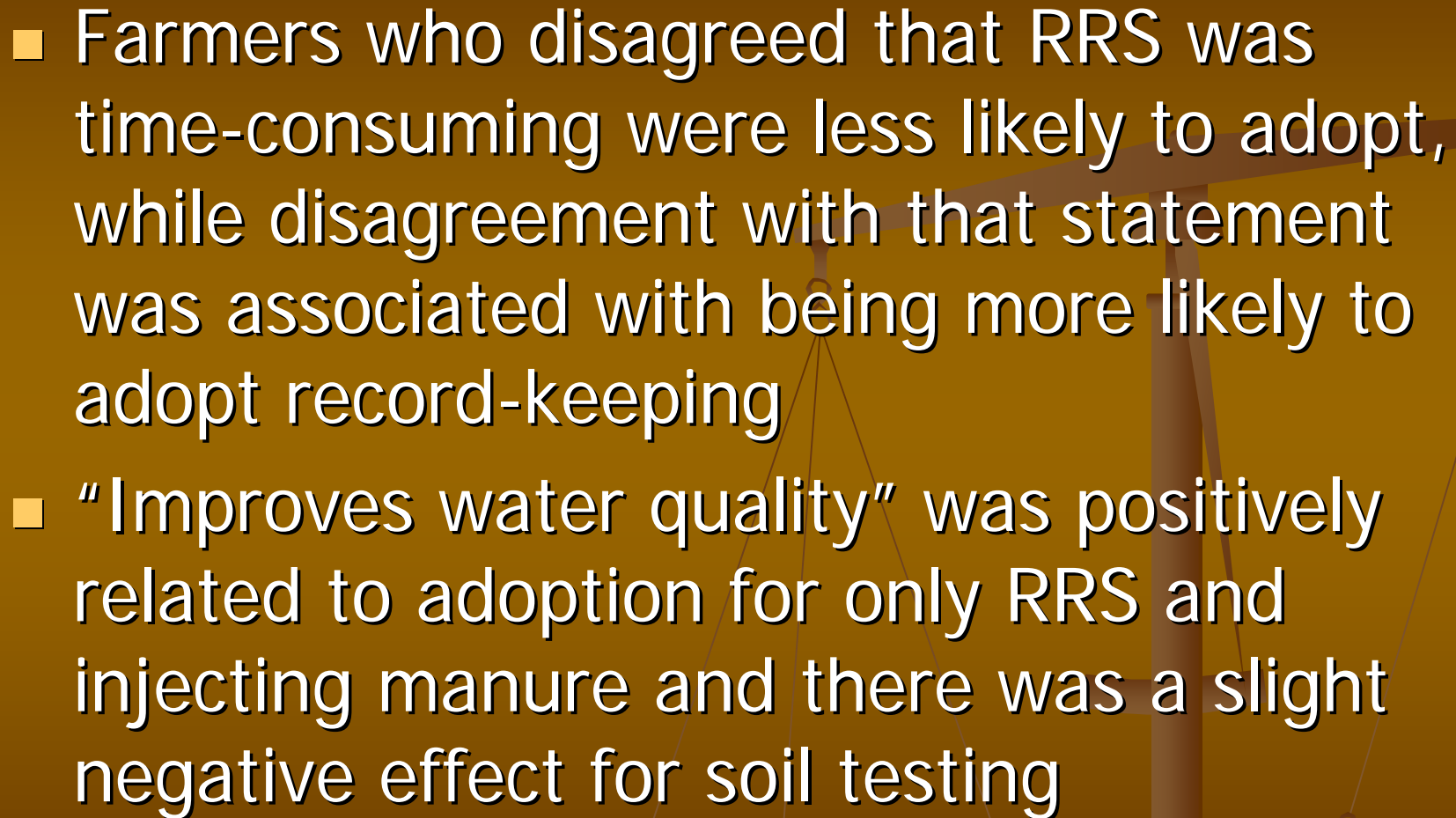
Practices

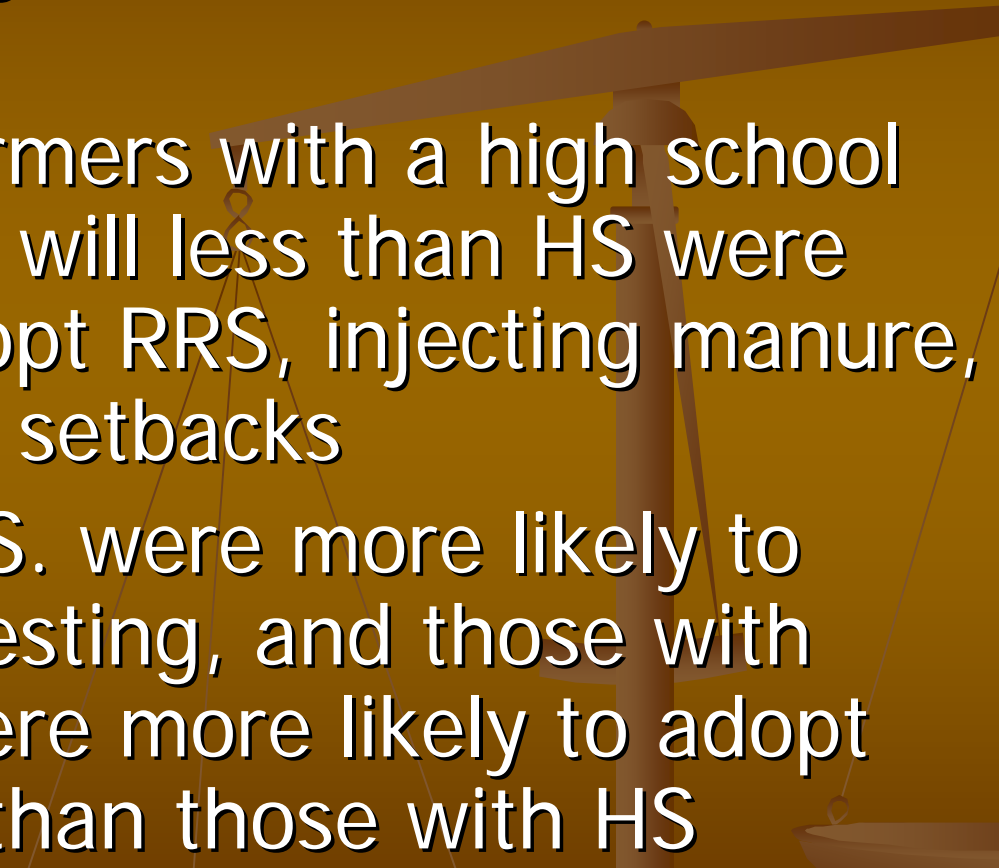
(% adoption for all farmers)

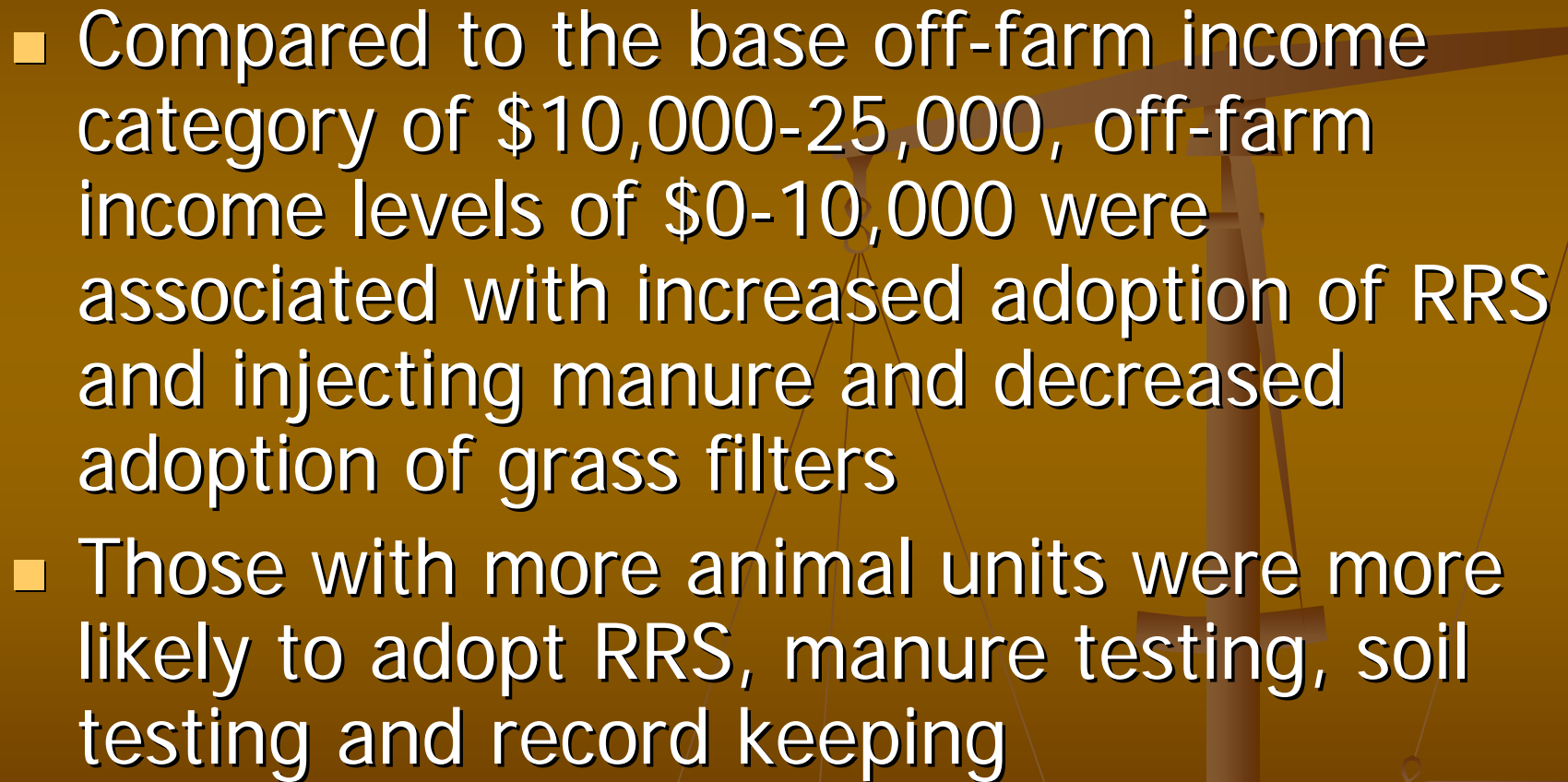
- Injection of manure (19%)
 - Grass filters near water sources (63%)
 - Soil testing (every 3 years, 73%)
 - Record keeping on manure applications (29%)
 - Round-up Ready Soybeans (84%)
 - Manure testing (every year, 22%)
 - Calibrating manure spreaders (19%)
 - Maintaining 100 ft. setbacks (61%)
 - Phytase (7.7/17.2% non-ruminants)
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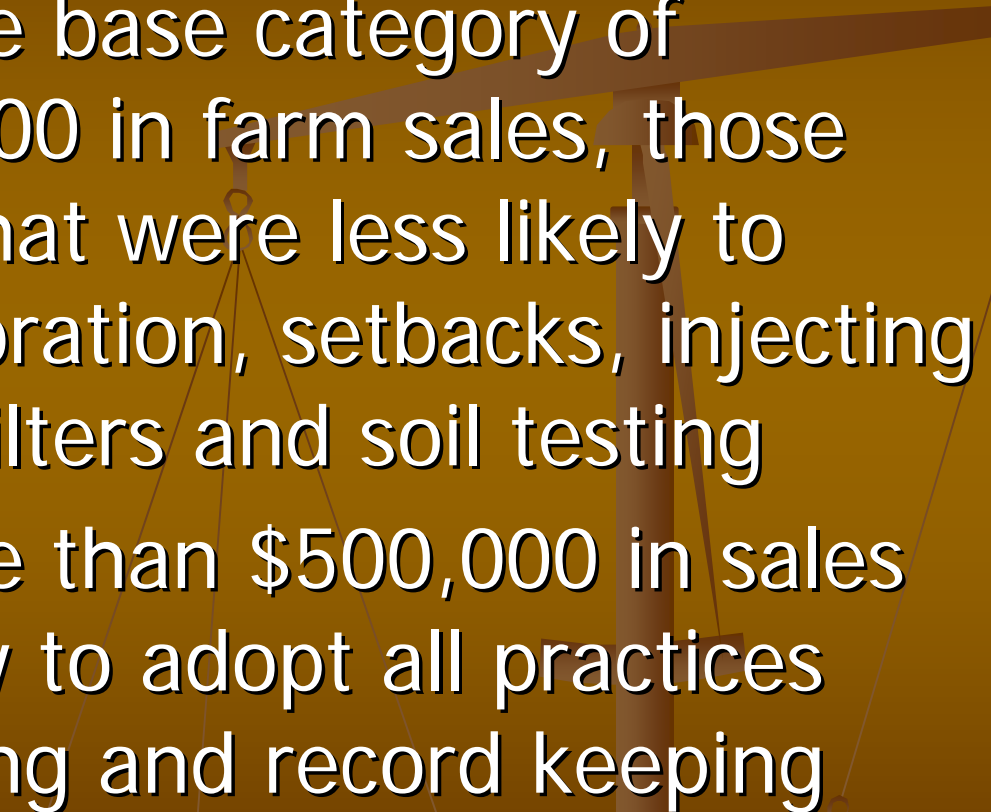
Findings

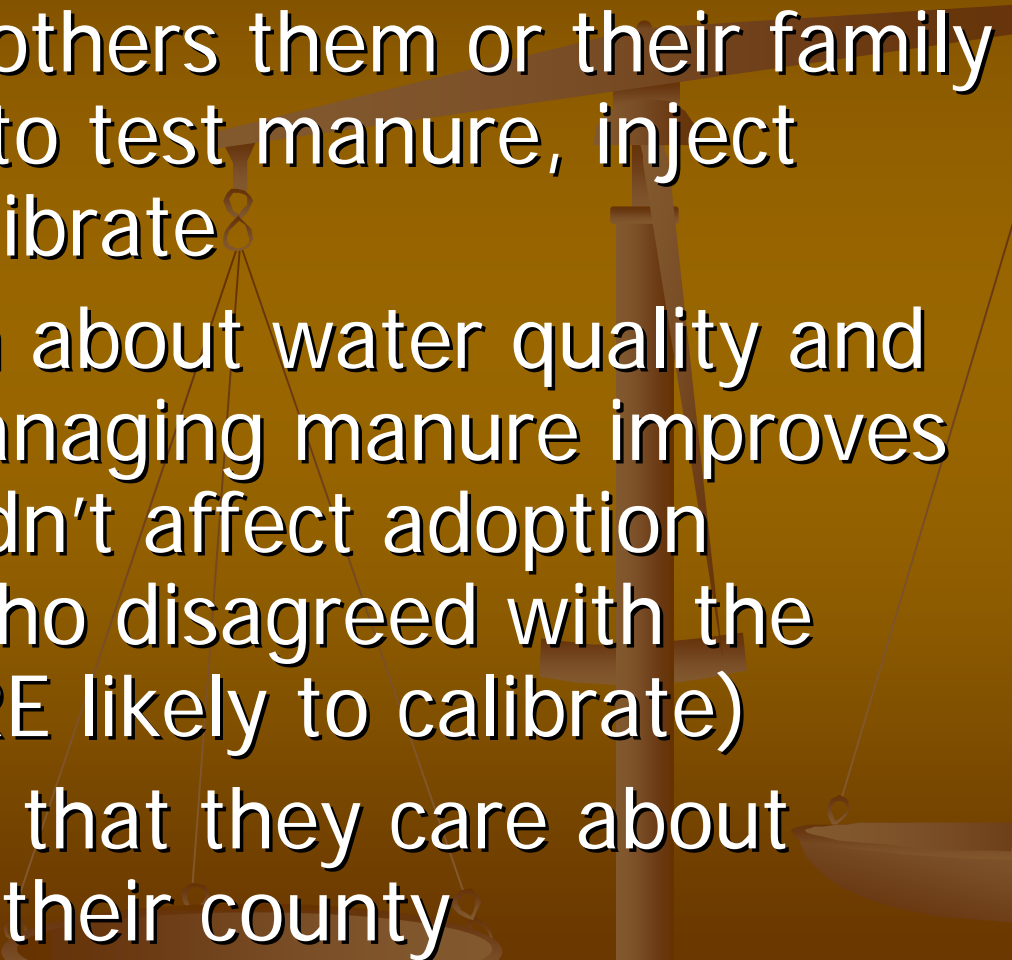
- (Results are “all else equal”, i.e. other factors are controlled for statistically)
 - Perceived profitability of the practice was positively related to adoption of all practices (and the only factor that was)
 - If farmers disagreed that the practice was complicated, they were more likely to adopt RRS, manure testing, calibration, injecting manure, grass filters, and soil testing than those who agreed it was complicated
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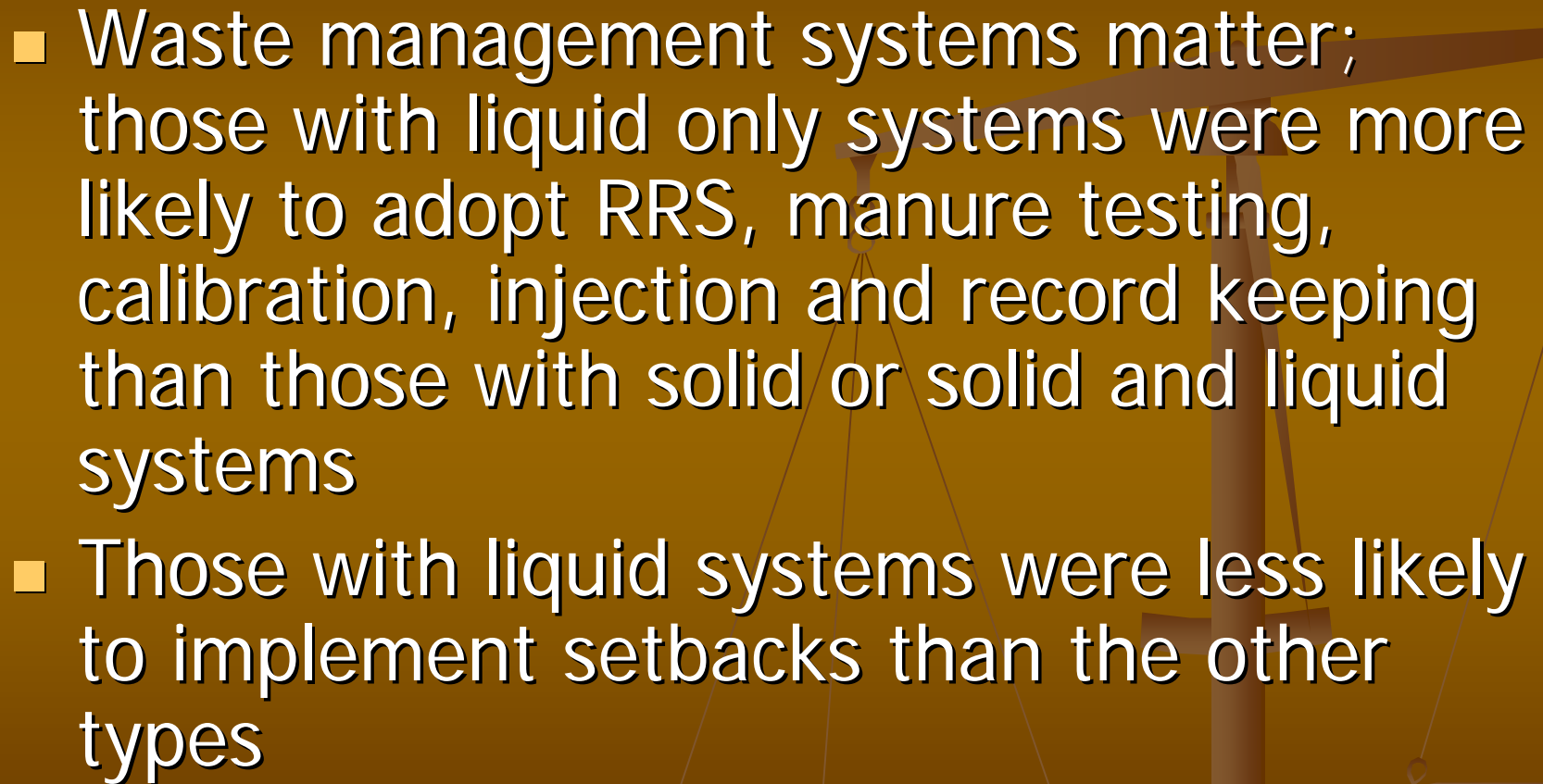
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- Farmers who disagreed that RRS was time-consuming were less likely to adopt, while disagreement with that statement was associated with being more likely to adopt record-keeping
 - “Improves water quality” was positively related to adoption for only RRS and injecting manure and there was a slight negative effect for soil testing

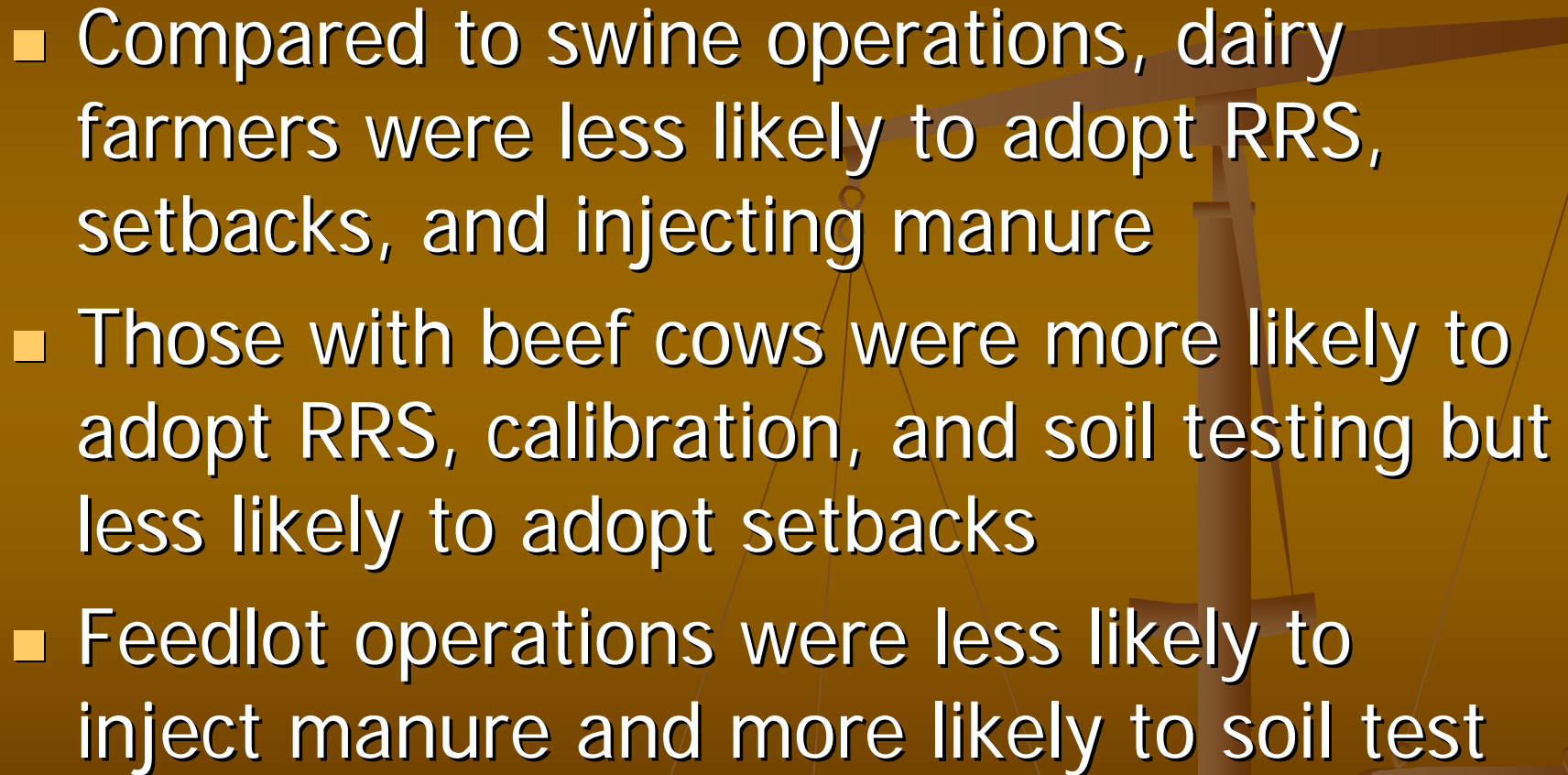
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- Older farmers were less likely to adopt RRS, setbacks, grass filters, and soil testing
 - Compared to farmers with a high school degree, farmers with less than HS were less likely to adopt RRS, injecting manure, grass filters and setbacks
 - Those with a B.S. were more likely to adopt manure testing, and those with some college were more likely to adopt record keeping than those with HS

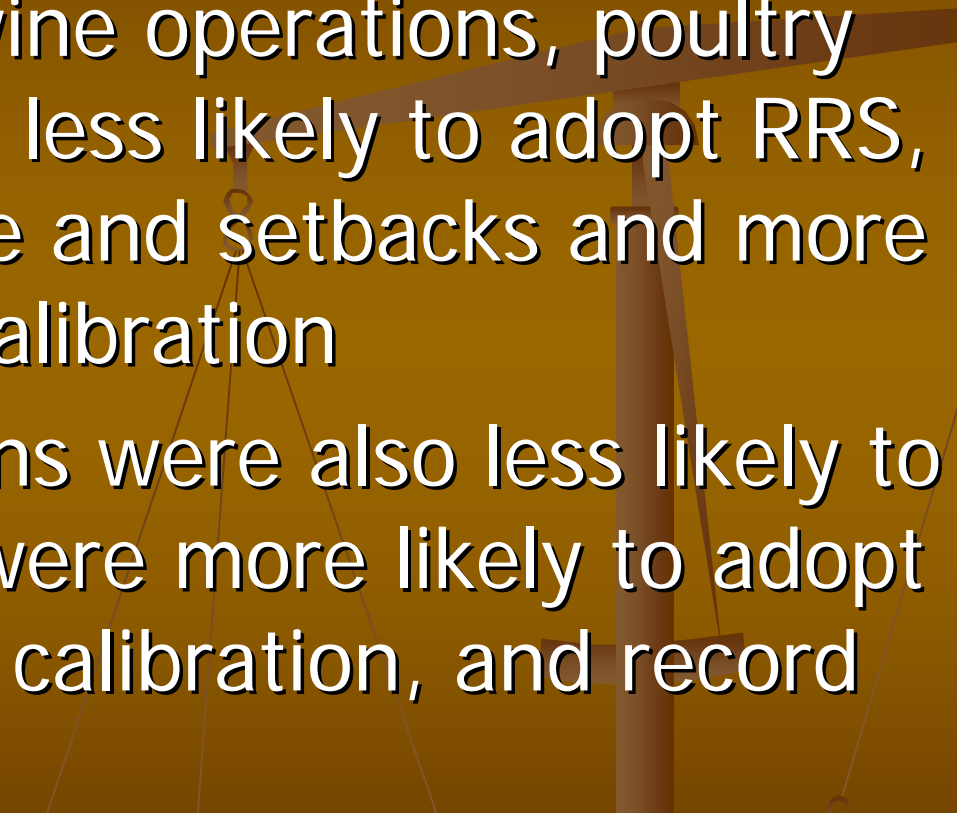
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- Compared to the base off-farm income category of \$10,000-25,000, off-farm income levels of \$0-10,000 were associated with increased adoption of RRS and injecting manure and decreased adoption of grass filters
 - Those with more animal units were more likely to adopt RRS, manure testing, soil testing and record keeping

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- Compared to the base category of \$100,000-250,000 in farm sales, those with less than that were less likely to adopt RRS, calibration, setbacks, injecting manure, grass filters and soil testing
 - Those with more than \$500,000 in sales were more likely to adopt all practices except soil testing and record keeping

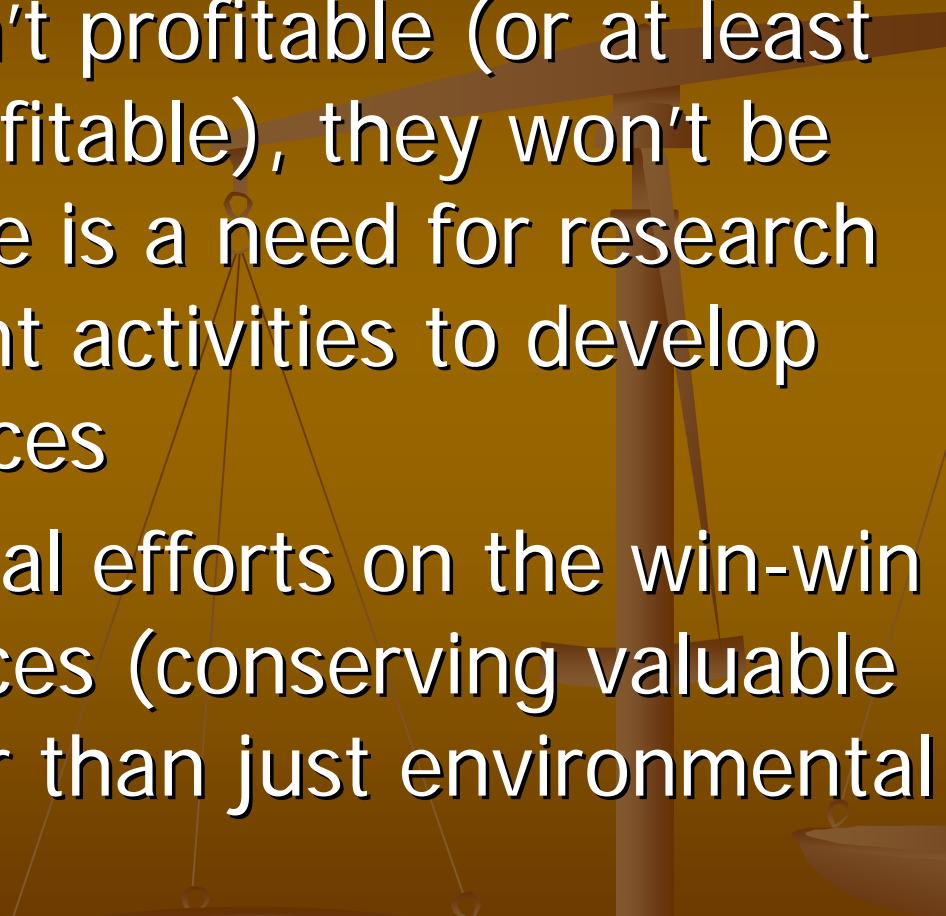
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- Smell of manure matters for some livestock farmers; those who indicated that the smell bothers them or their family were less likely to test manure, inject manure, and calibrate
 - General concern about water quality and thinking that managing manure improves water quality didn't affect adoption (except those who disagreed with the latter were MORE likely to calibrate)
 - High agreement that they care about water quality in their county

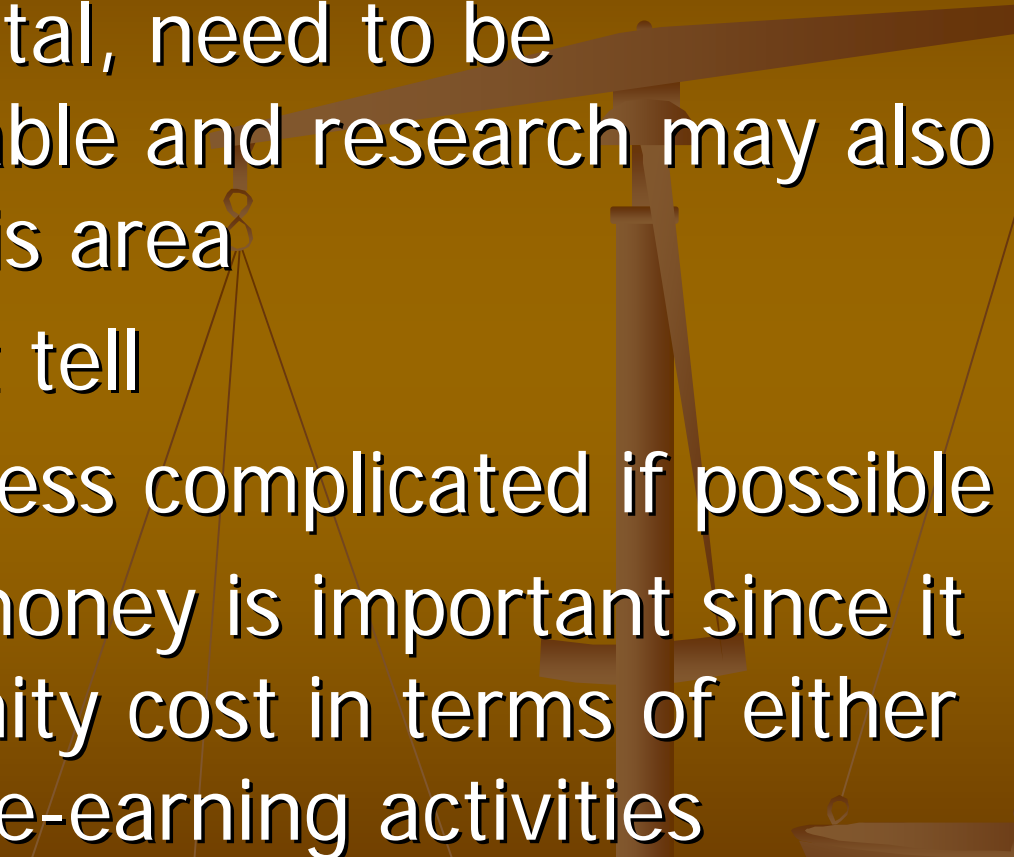
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- Waste management systems matter; those with liquid only systems were more likely to adopt RRS, manure testing, calibration, injection and record keeping than those with solid or solid and liquid systems
 - Those with liquid systems were less likely to implement setbacks than the other types

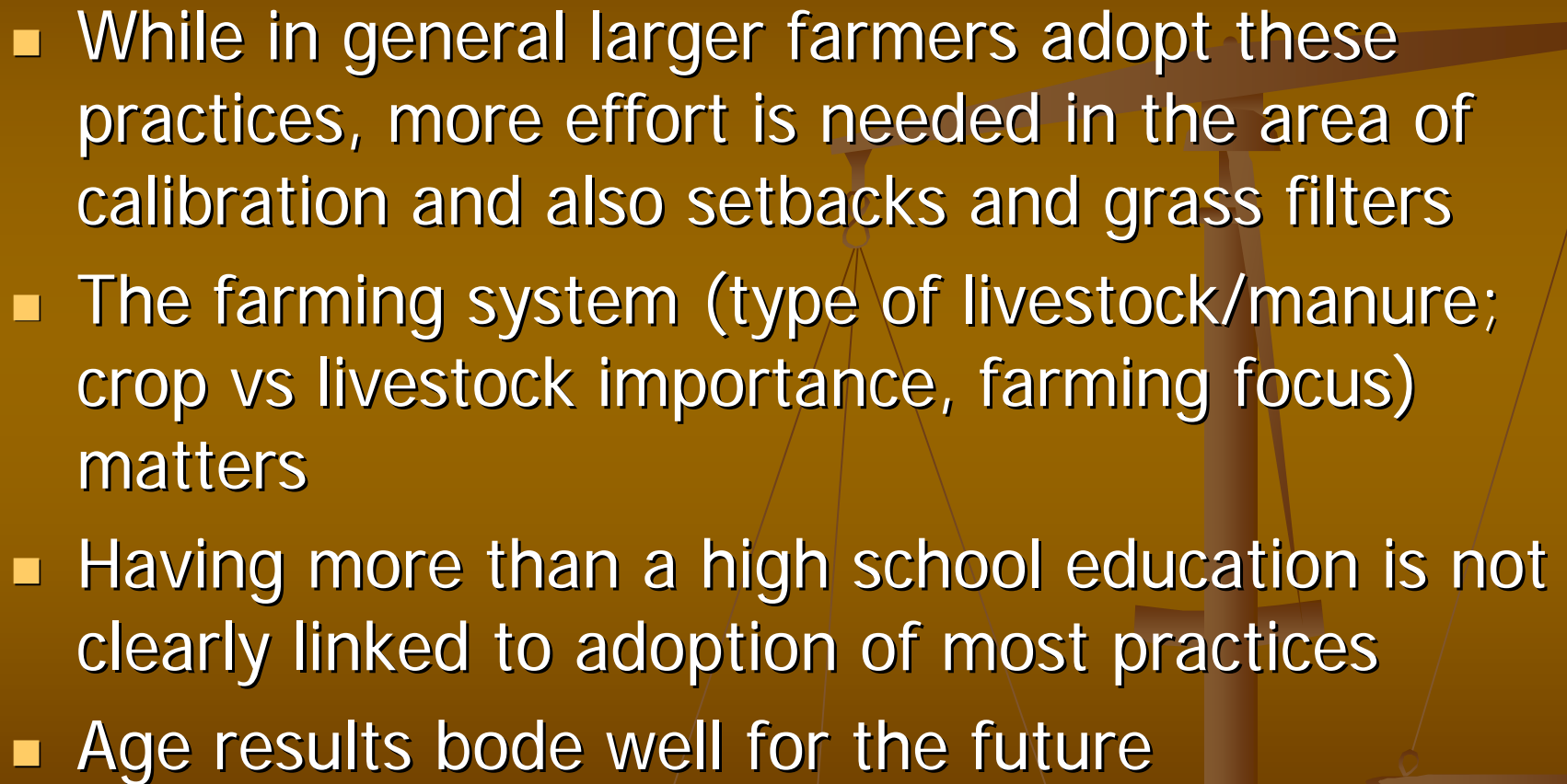
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- Compared to swine operations, dairy farmers were less likely to adopt RRS, setbacks, and injecting manure
 - Those with beef cows were more likely to adopt RRS, calibration, and soil testing but less likely to adopt setbacks
 - Feedlot operations were less likely to inject manure and more likely to soil test

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- Compared to swine operations, poultry operations were less likely to adopt RRS, injecting manure and setbacks and more likely to adopt calibration
 - Turkey operations were also less likely to adopt RRS but were more likely to adopt manure testing, calibration, and record keeping

Implications

- If practices aren't profitable (or at least not wildly unprofitable), they won't be adopted so there is a need for research and development activities to develop profitable practices
 - Focus educational efforts on the win-win nature of practices (conserving valuable nutrients) rather than just environmental quality
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- The benefits of practices, both financial and environmental, need to be obvious/observable and research may also be needed in this area
 - Show, don't just tell
 - Make practices less complicated if possible
 - Time, not just money is important since it has an opportunity cost in terms of either leisure or income-earning activities

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- While in general larger farmers adopt these practices, more effort is needed in the area of calibration and also setbacks and grass filters
 - The farming system (type of livestock/manure; crop vs livestock importance, farming focus) matters
 - Having more than a high school education is not clearly linked to adoption of most practices
 - Age results bode well for the future

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