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# RE-ESTABLISHING PERENNIAL VEGETATION: THE SALTBUCH CASE AN ENVIRONMENTAL OR ECONOMIC PROPOSITION!

Dean A Patton\*<sup>a</sup>, Peter L Milthorpe<sup>b</sup>, Margaret J Wynne<sup>b</sup> and Brett M Honeysett<sup>b</sup>

<sup>a</sup> NSW Agriculture, PMB19, Trangie, NSW 2821

<sup>b</sup> NSW Agriculture, PO Box 300, Condobolin, NSW 2877

## INTRODUCTION

It is generally accepted that the various forms of land degradation, eg. wind and water erosion, soil salinisation and acidification, have reduced the productive potential of our rangelands and farmlands. In addition, it is suggested that land degradation not only impacts the productive potential of this land but also the goods and services provided to society, for example amenity, conservation values etc. To redress this concern, new techniques, alternative management practices or new technologies are proposed. Ideally, these proposals would not only improve the resilience of the system against further land degradation but provide sufficient private incentive for landholders to adopt these proposals.

Unfortunately, land degradation is most severe in the event of extreme climatic variability, for example prolonged dry periods, and intense rainfall events. Land managers have adopted techniques that minimise the physical and economic impacts of these events, for example, retaining stubble and conservative stocking strategies. However, prolonged dry spells still cause significant physical damage to the land resource.

One possible alternative, the focus of ongoing research, is the establishment of perennial forage shrubs, such as Old Man Saltbush (OMSB). Managed properly and utilised as a forage source in both normal and extended dry periods, a plantation of OMSB could reduce the short term financial pressure of grain purchases during dry periods and potentially delay tactical decisions such as agistment, grain feeding or selling livestock. In addition to these private incentives, some of the environmental benefits of re-introducing perennial vegetation could also be achieved.

## THE STUDY

This poster presents the results of an evaluation whereby a small proportion of a farm in the central west of NSW, is set aside to establish a plantation of forage shrub, in this case OMSB (Patton *et al.* 2000). The study evaluated the contribution of OMSB for its interaction with the farming system through its utilisation as a strategic spelling tool, filling seasonal feed gaps and in drought preparedness. It was undertaken to determine whether there is sufficient private financial incentive for the individual landholder to adopt this potentially positive environmental strategy.

Three establishment techniques: direct seeding; speedlings (tubestock), and bare-rooted stock as well as two plantation sizes, two and a half and five percent of the property, are compared to a traditional tactical grain feeding strategy. Benefit-cost criteria were applied to the development budgets for the alternative investment proposals to determine if the returns from establishing a plantation of OMSB cover the capital investment cost. However, investing in drought preparedness strategies rather than tactically responding to drought also changes the landholders exposure to climatic and price risk. Therefore, when assessing these investment proposals, not only must expected returns be considered but also the risks associated with each alternative. Stochastic dominance tests were used to determine the dominant strategy considering climatic variability, size of plantation and landholders risk preferences.

## RESULTS

Figure 1 represents the cumulative distribution functions (CDF's) for analysis of the 70 ha plantation (two and a half percent of the farm). This graph suggests that only one of the proposed investments in OMSB, established using the bare-rooted technique, will always return more than the without saltbush alternative. Whereas the without saltbush alternative has approx. an 60 percent probability of returning more than the direct seeding alternative and a 100 percent probability of returning more than the speedling alternative. Therefore, as the CDF for the bare-rooted alternative is always to the right

of all other alternatives it dominates these alternatives in the sense of first-degree stochastic dominance. Similarly as the without saltbush alternative is always to the right of the speedling alternative it dominates this alternative in the sense of first-degree stochastic dominance. Considering Australian farmers are typically risk averse (Patton *et al.* 2000), decision makers would prefer the without alternative over the direct seeding alternative in the sense of second-degree stochastic dominance.

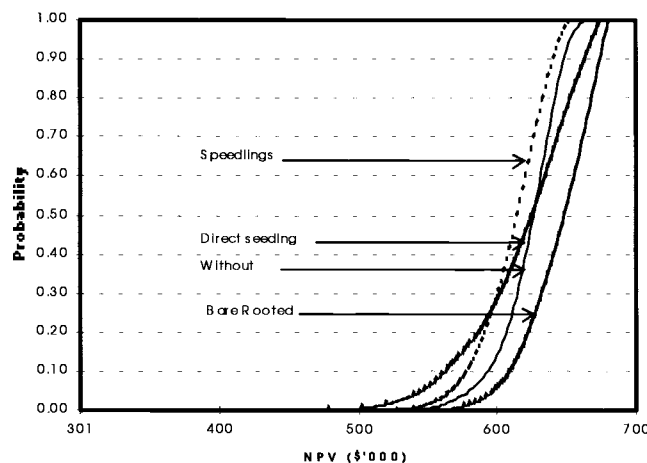


Figure 1. CDF’–

2.5% of property as plantation.

## DISCUSSION OF RESULTS

It was found that landholders could potentially benefit financially from the introduction of a forage shrub plantation, establishing two and a half percent of the property using the bare-rooted technique, when compared to the existing strategy of tactically grain feeding in the sense of first-degree stochastic dominance. However, when the area of saltbush was increased to 5 percent of the property, the existing tactical grain feeding strategy was desired. The reason lies in the additional benefits being insufficient to offset the additional capital costs. In all cases, it was found that the existing tactical grain feeding strategy was desirable when compared to the speedling and direct seeding alternatives.

## CONCLUSION

These results provide a useful reference for future proposals that aim to improve the resilience of agricultural systems against the impact of drought and its potential for land degradation. For farms in the central west the study found that there is insufficient private incentive to establish more than 2.5 percent of the farm to this potentially positive environmental strategy.

This study did not attempt to evaluate any of the public benefits of establishing only 2.5 percent of the farm. Consequently, this study should be viewed as the first step in assessing the suitability of forage shrub plantations for landholders in the central-west of NSW. However, if on environmental grounds greater than 2.5 percent of the farm, established to a perennial shrub like OMSB, is desired, then it is unlikely that landholders will adopt the recommendation based on our current estimates of the private economic incentives.

## REFERENCES

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