**Appendix: Theorem relating second order stochastic dominance to risk aversion**

**Theorem [Meyer (1977, theorem 2)]:** For cumulative distribution functions and ,

If and only if

## Appendix A: Computing WTP bounds and benefits for risk averse farmer

We follow closely the notation and derivation by Hurley et al (2018). Consider the following notation

: Bounded random yield where ,

: Yield density functions for baseline farmer practice

: Yield density functions for new agronomic innovation

: Cumulative distribution functions for baseline farmer practice

: Cumulative distribution functions for new agronomic innovation

A farmer has a thrice differentiable, risk averse utility of yield function such that , and

A farmer is expected to weakly prefer the new agronomic management innovation if

One may compare the area under the cumulative distributions

If

Then the new agricultural innovation will be weakly preferred.

With price risks and production costs,

**WTP question is:** How much wheat/rice per hectare would a risk-averse farmer be willing to give up/pay to use the new agronomic innovation?

**Answer:** It is the that satisfies,

According to Hurley et al (2018), the lower WTP bound that makes any risk-averse farmer prefer new technology (in this case scenarios other than the baseline) can be derived using second order stochastic dominance as follows:

Where is the lower bound for the willingness to pay.

Similarly, for the upper bound,

**If *both lower bound and upper bound are positive***, then any risk averse farmer will prefer to . Conversely, if *both lower bound and upper bound are negative*, then any risk averse farmer will prefer to .

To include price information, we simply compare the WTP bounds to the price information

Table A1: Interpretation of willingness to pay bounds

|  |  |  |  |
| --- | --- | --- | --- |
| Lower bound | Upper bound | General interpretation | Specific intepretation |
| Negative | Negative | Need to be paid to take up new strategy | * Need to be paid **upper bound amount** to be indifferent * Need to be paid lower bound amount to **abandon base strategy** |
| Negative | Positive | Indifferent | * Need to be paid lower bound amount to **abandon base strategy** * Willing to pay upper bound amount to stay with new strategy |
| Positive | Positive | Willing to pay for the new strategy | * Willing to pay lower bound **amount to be indifferent** * Willing to pay upper bound amount to stay with new strategy |