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**Wheat Stubble Management in the Fars
Province Of Iran: Using a SERF Approach**

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Outline

- Introduction
- Research objectives
- Research method and Data
- Results
- Conclusions

Area of study



Map of Iran

Shiraz Map



Problem to be studied

- What is the best strategy for wheat stubble management ?

Objectives

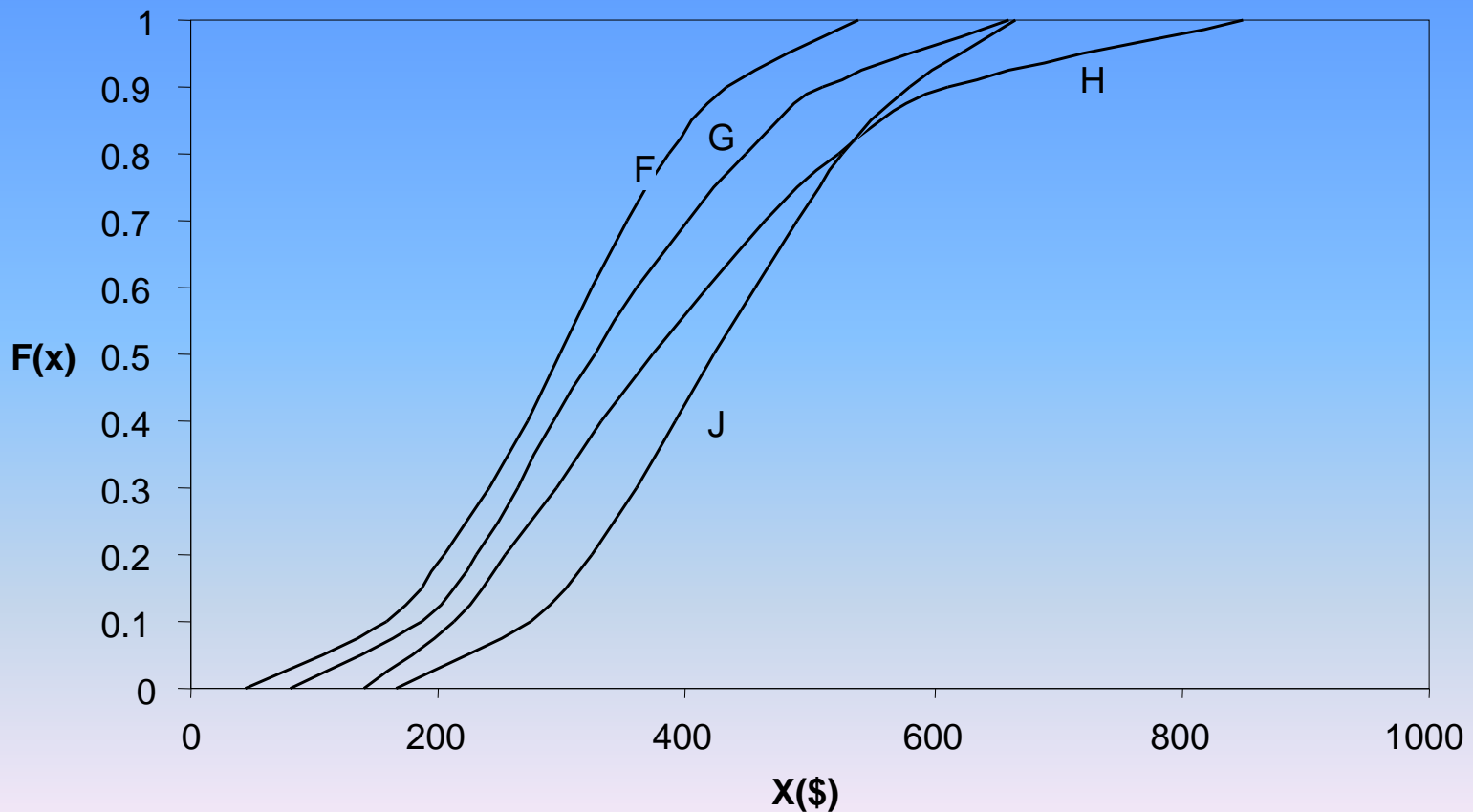
- ❑ To find best wheat stubble management scenario
- ❑ To test the SERF approach in compare with other approaches

Method

1. First-degree stochastic dominance (FSD)
2. Second-degree stochastic dominance (SSD)
3. Third-degree stochastic dominance (TSD)
4. Convex stochastic dominance (CSD)
5. Stochastic dominance with respect to a function (SDRF)
6. Stochastic efficiency with respect to a function (SERF)

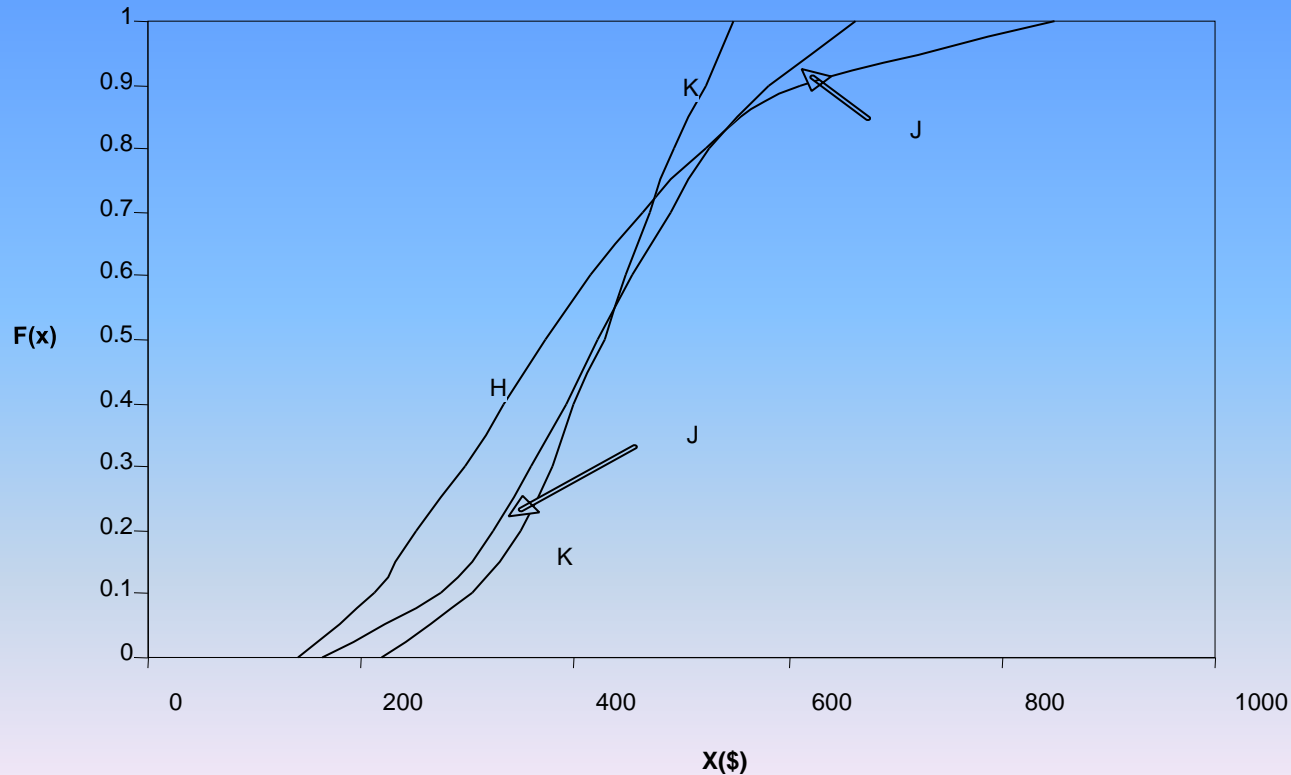
First-degree stochastic dominance

$$F_A \preceq F_B$$



Second-degree stochastic dominance

$$\int_{-\infty}^{x^*} F_A(x) dx \leq \int_{-\infty}^{x^*} F_B(x) dx$$



Stochastic Efficiency with Respect to a Function (SERF)

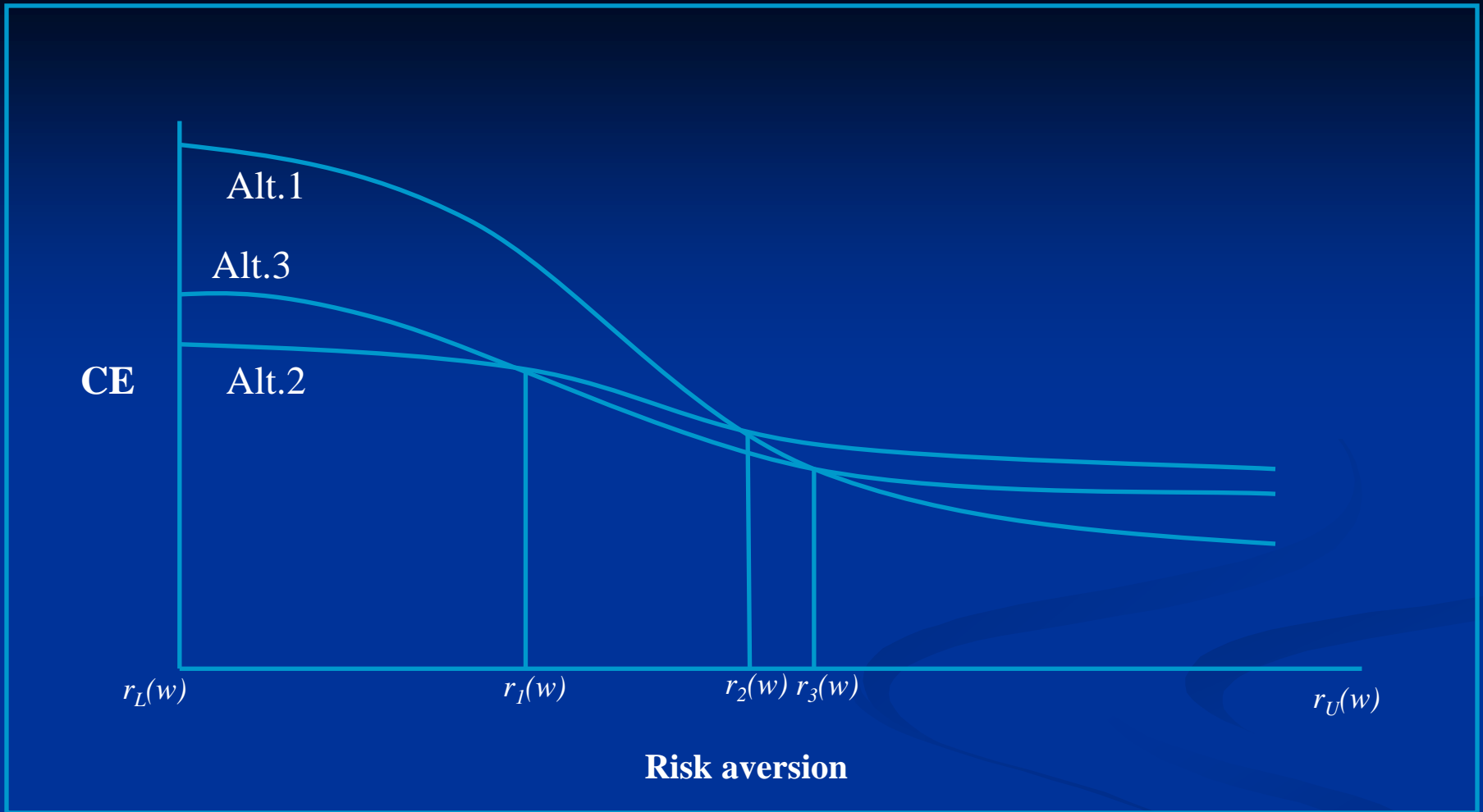
- SERF method can be applied for any utility function for which the inverse function can be calculated.

Continued

- A vector of CE values for each of the n alternatives calculated for several values of $r(w)$ within the bounds $r_L(w) \leq r_i(w) \leq r_U(w)$. At each $r_i(w)$ only the alternative that yields the highest CE is efficient. The efficient set can be identified over a subset of the full range of $r_i(w)$, as might be required for policy analysis.

Continued

- Only those alternatives which have the highest (or equal highest) CE values for some value in the range of $r(w)$ are utility efficient. All other alternatives are dominated in the SERF sense.



With the SERF method alternative 3 is not utility-efficient as it is dominated by one of the other alternatives at every level of risk aversion.

Data

- The historical data (1993-97) for 7 risky alternatives were used in this study. The experiment was conducted in Shiraz university, College of agriculture, Koshkak Experimental Station.

Scenarios

- ❑ Sowing after burning the wheat stubble (S1)
- ❑ Sowing after removing the wheat stubble (S2)
- ❑ Sowing after plowing the wheat stubble (S3)
- ❑ Sowing in wheat stubble with Chisel seeder when the straw was left erect (S4)
- ❑ Sowing in wheat stubble with Chisel seeder when the land was first irrigated (S5)
- ❑ Sowing in wheat stubble with Chisel seeder when the land was first irrigated and herbicide applied (S6)
- ❑ Sowing after disking wheat stubble (S7)

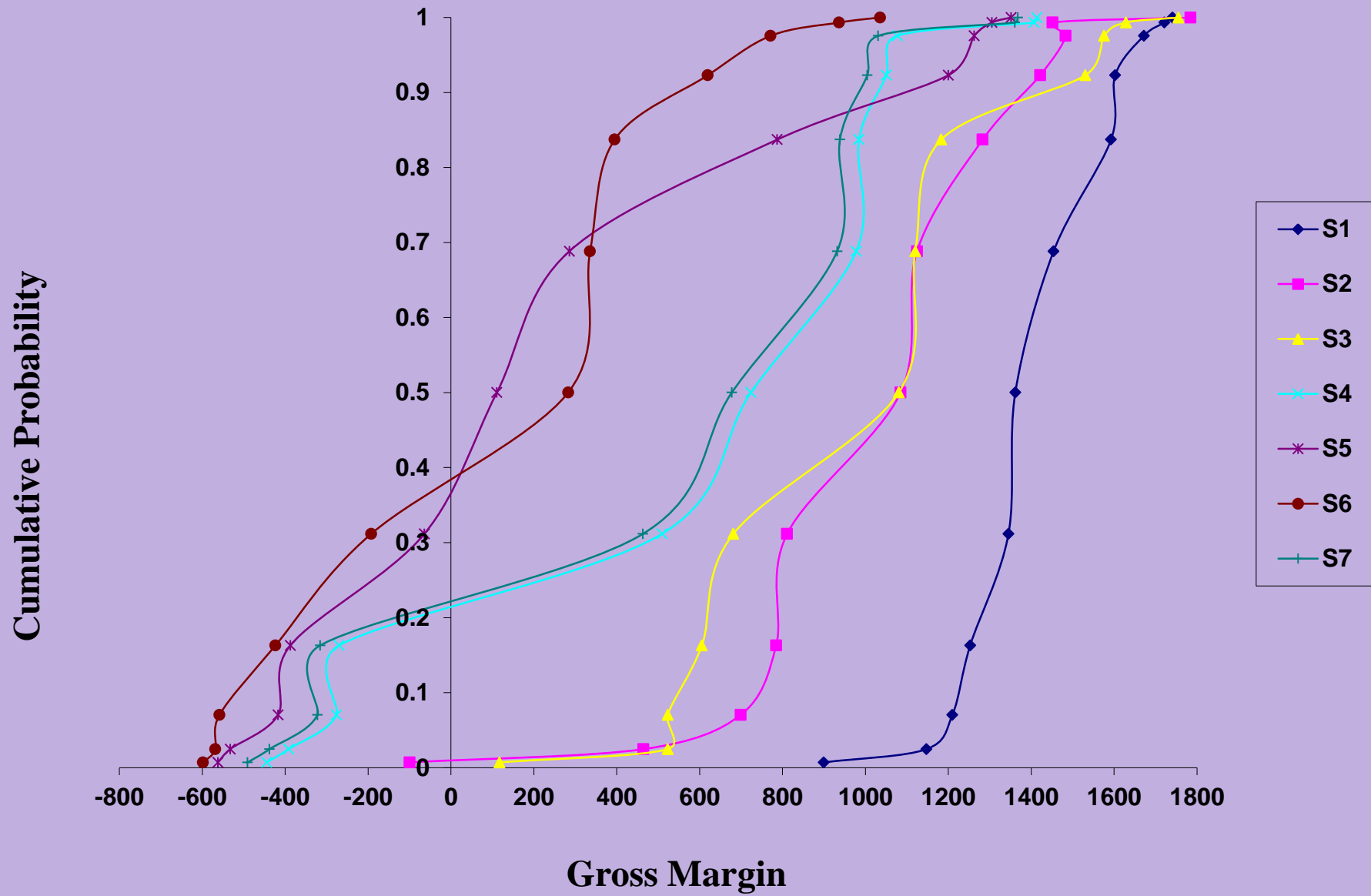
Results

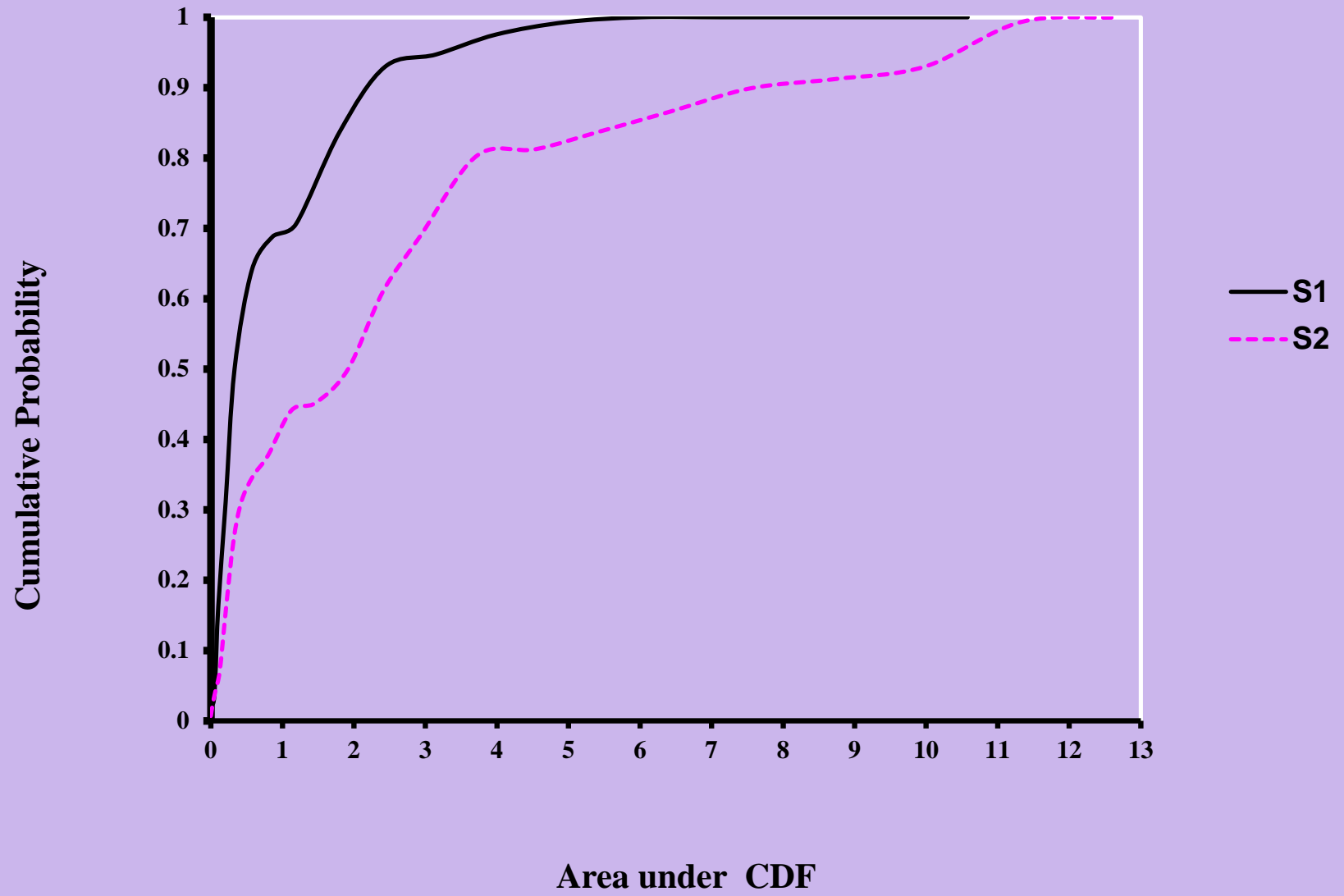
- FSD Ranking of Stochastic alternatives:

$$(S1, S2, S3) > (S4, S7) > S5 > S6$$

- SSD Ranking of Stochastic alternatives:

$$S1 > (S2, S3) > (S4, S7) > S5 > S6$$

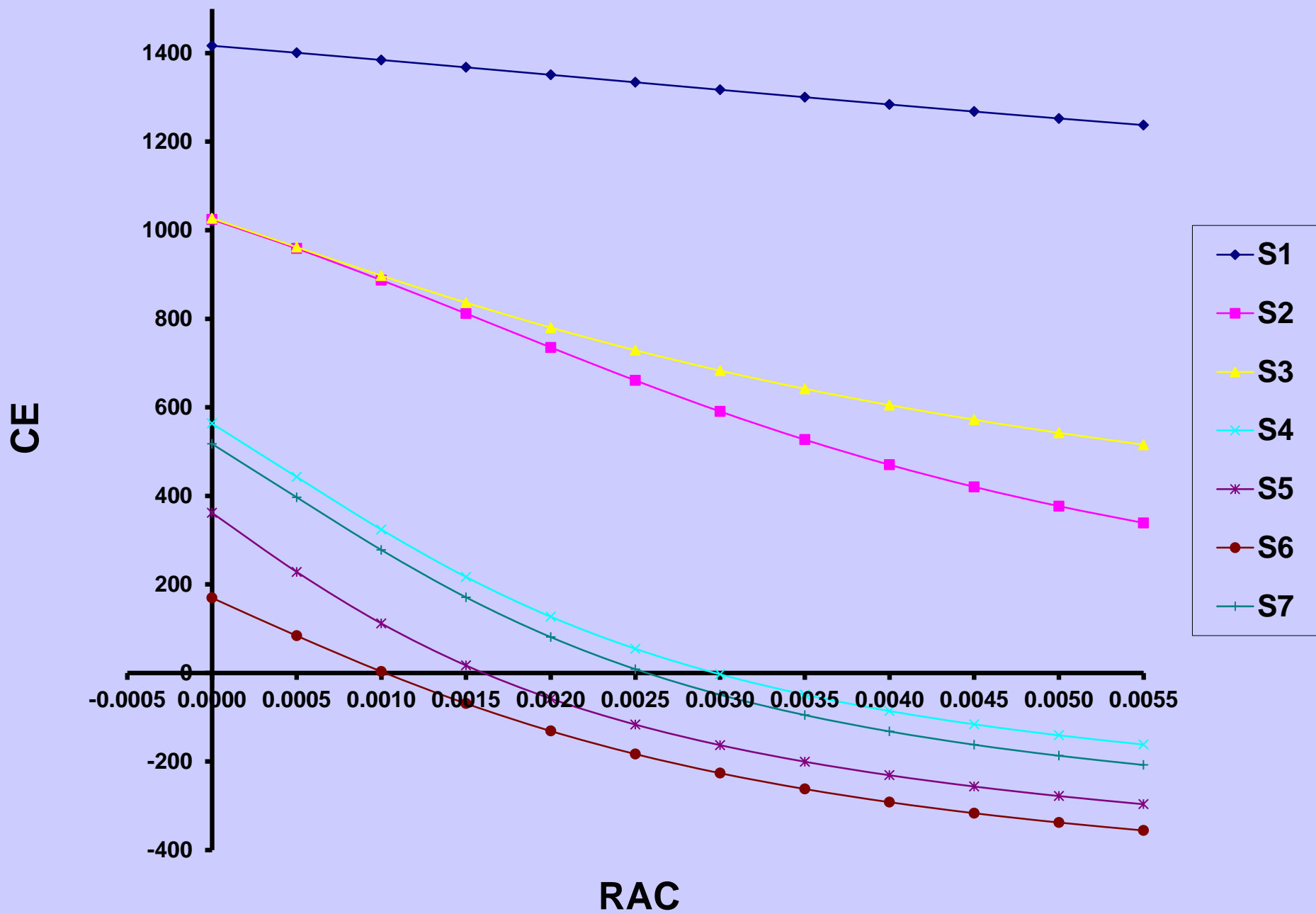




Results

SERF Ranking of the alternatives:

$S1 > S3 > S2 > S4 > S7 > S5 > S6$



Conclusions

- SERF is :

- ✓ Easy to use

- ✓ Easy to understand, and

- ✓ had precise ranking of risky alternatives

Continued

- The S1 scenario (sowing after burning the wheat stubble) maximizes the profit.
- The S3 scenario (sowing after plowing the wheat stubble), which is environmentally preferred, is in rank 2, So it seems that environmental factors should be incorporated in the analysis in future studies.