



Guide to Irrigation Sprinkler Packages

At Utah State University (USU), researchers tested multiple sprinkler types to evaluate their performance in terms of water application efficiency, runoff potential, evaporation losses, and suitability for various soils and slopes. They were ranked in terms of ease of maintenance, price, allowable field slope, wheel track depth, and losses to wind. These

MESA (Mid Elevation Spray Application)

MESA systems use spray nozzles mounted several feet above the ground, typically on drop tubes that hang from the pivot.

- Easy to maintain and commonly used; offers good water distribution over taller crops.
- The higher spray height leads to more evaporation and wind drift, especially in hot or breezy conditions.

Maintenance	Price	Slopes	Wheel Tracks	Wind
1st	1st	2nd	4th	4th

LEPA (Low Energy Precision Application)

LEPA systems use bubbler-type heads or pads to apply water in narrow streams directly into furrows or small basins at ground level.

- Extremely efficient—minimizes water loss by delivering water directly to the soil with minimal exposure to air.
- Requires furrow dikes or row management to keep water in place, not ideal for uneven or sloped terrain.

Maintenance	Price	Slopes	Wheel Tracks	Wind
3rd	3rd	4th	2nd	2nd

LESA (Low Elevation Spray Application)

LESA systems are like MESA but place spray nozzles just 12–18 inches above the soil, reducing the distance water travels through the air.

- Very efficient in reducing evaporation and wind losses, making it ideal for water conservation.
- On compact or tight soils, water can pool or run off if the application rate exceeds infiltration.

Maintenance	Price	Slopes	Wheel Tracks	Wind
2nd	2nd	3rd	3rd	3rd

MDI (Mobile Drip Irrigation)

MDI uses flexible drip lines that trail behind the pivot and slowly release water directly onto the soil surface, like traditional drip irrigation.

- Combines pivot convenience with drip-level efficiency—minimizing evaporation and ensuring deep soil penetration.
- Tubes can wear or clog over time, especially in weedy fields or on rough ground, requiring regular maintenance.

Maintenance	Price	Slopes	Wheel Tracks	Wind
4th	4th	1st	1st	1st

comparisons help irrigators select the most effective package to maximize water use and crop production.

Results: All packages performed well when properly managed, but **LEPA, LESA, and MDI** showed the highest water application efficiency due to reduced evaporation and wind drift. **MESA** had higher losses to evaporation but remains effective on fields where other systems may not be practical.

View Full Factsheet: <https://extension.usu.edu/crops/research/irrigation-pivots-laterals>

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