Irrigation Equipment Options

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www.msue.msu.edu - find St. Joseph Co.
- then hit the Irrigation button

Average irrigation cost have risen from $530/acre in 1985 to over $900/acre currently.

Field size have decreased and equipment prices have more than doubled in two decades.

Farmers have benefited Michiana's rural economies by investing $140 million in irrigation equipment in the six most heavily irrigated counties.

Irrigation Equipment Options

Side Role

Drip and Trickle

Hand move

Solid set

Linear Move

Big Gun Travelers

Center Pivots

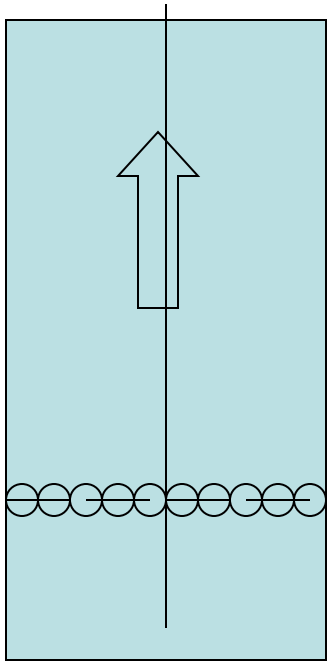
MWPS -30 $20 ??

Side Role

or

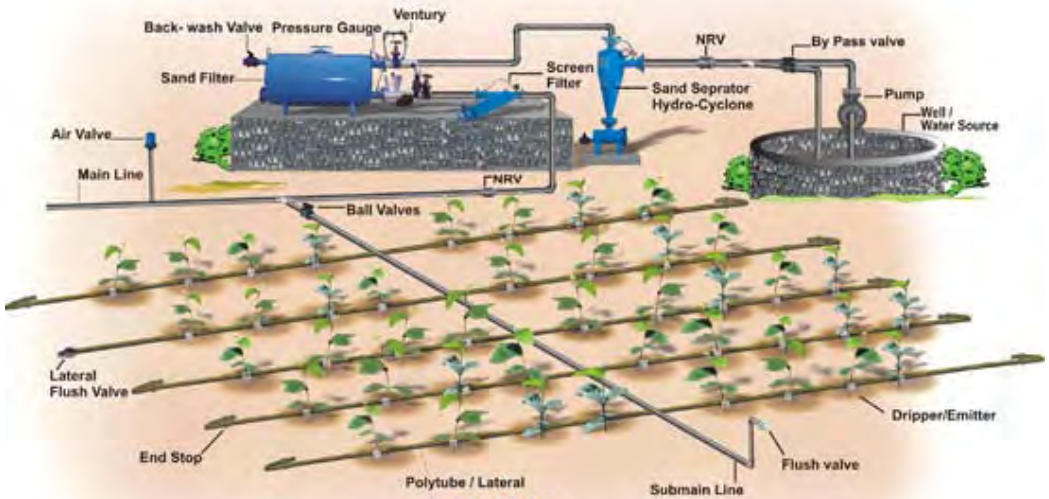
Hand Roll

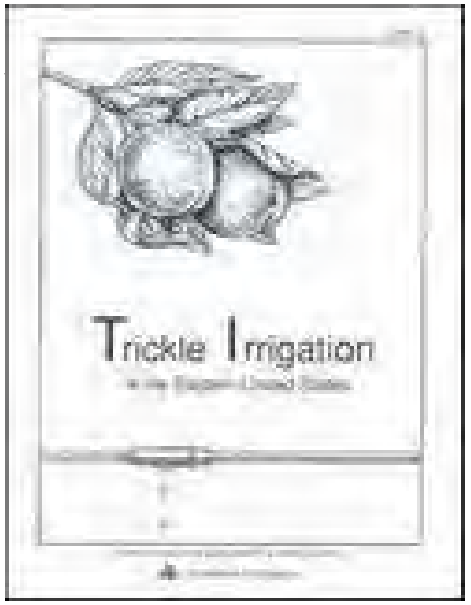
-Crop heights up to 30”
-Low cost compared to pivots
-Not common east of Mississippi



Drip and Trickle

- Precise application of water to a specific area.
- Excels where irrigating a portion of field is desired.
- Excels where watering only the root is desired or when tool root saturation of soil is not achieved.
- http://mtngrv.missouristate.edu/Publications/Drip_Irrigation_&_Watering_Web_Links.pdf
- Trickle Irrigation in the Eastern United States NRAE



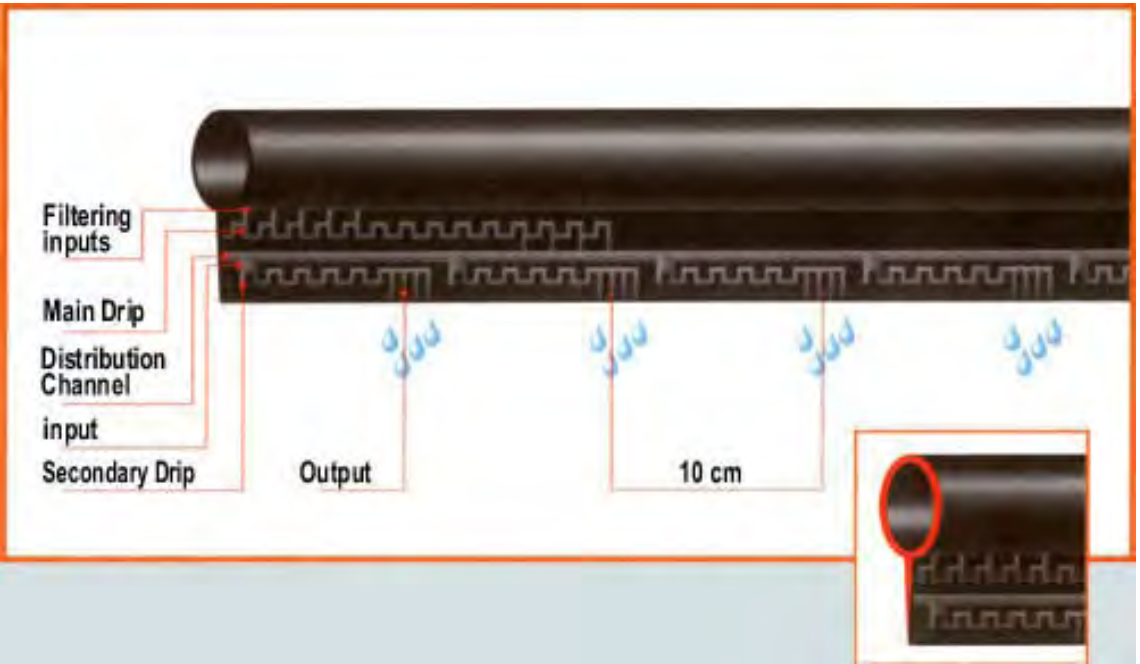


Issues of water quality and purity

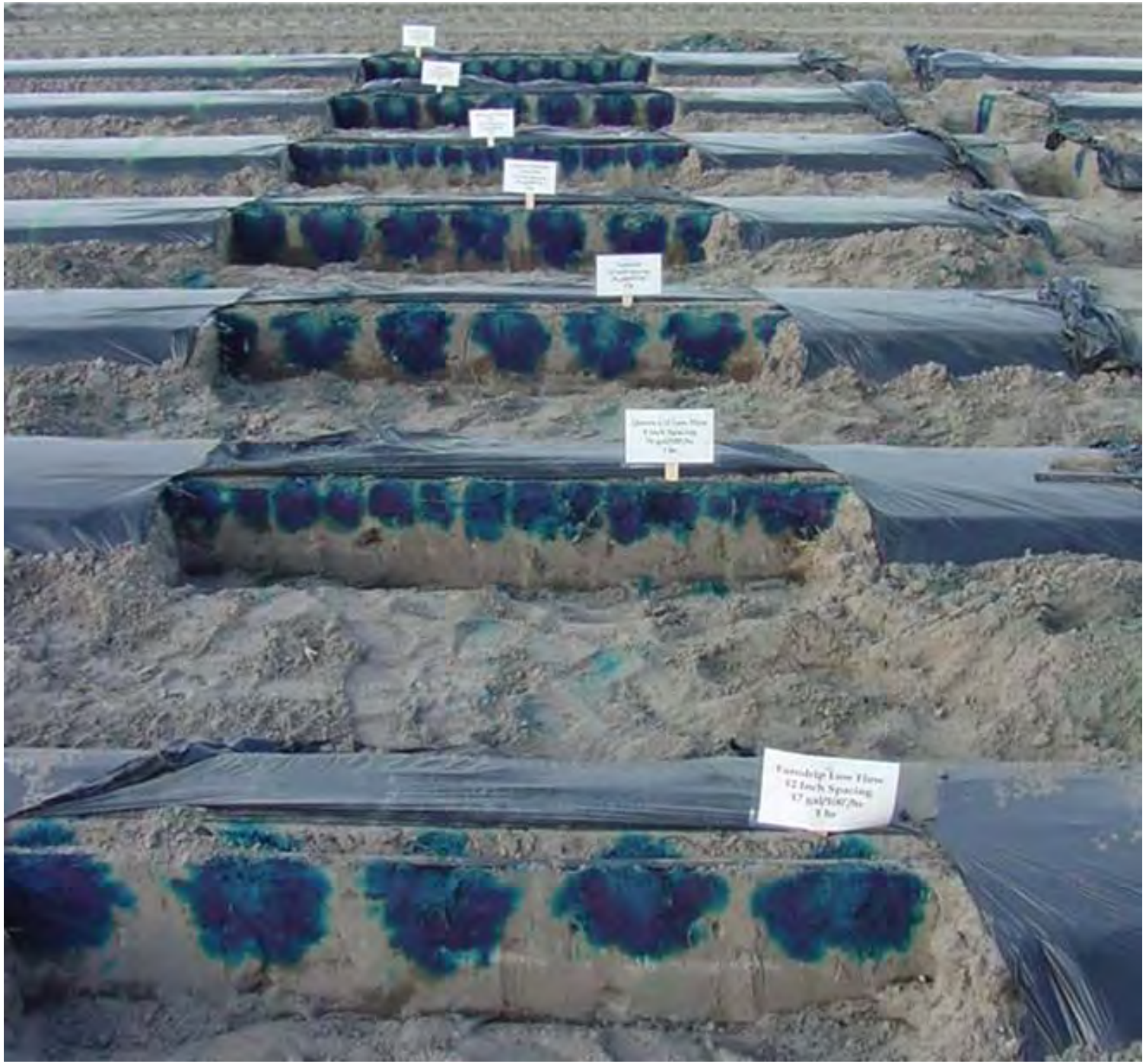
Filters?

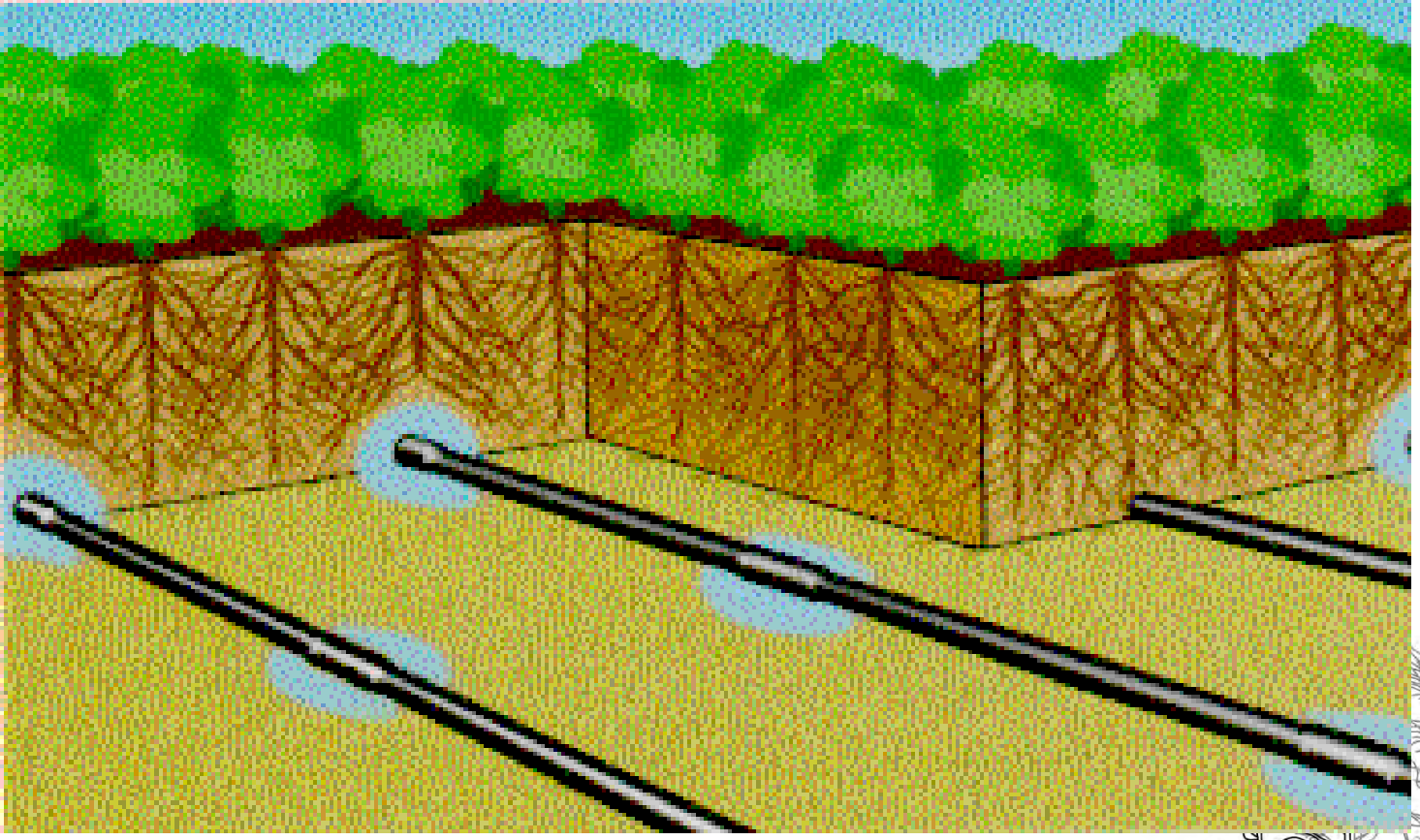
Pressure Compensating:

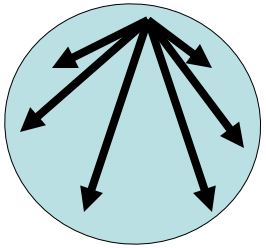
Emitters



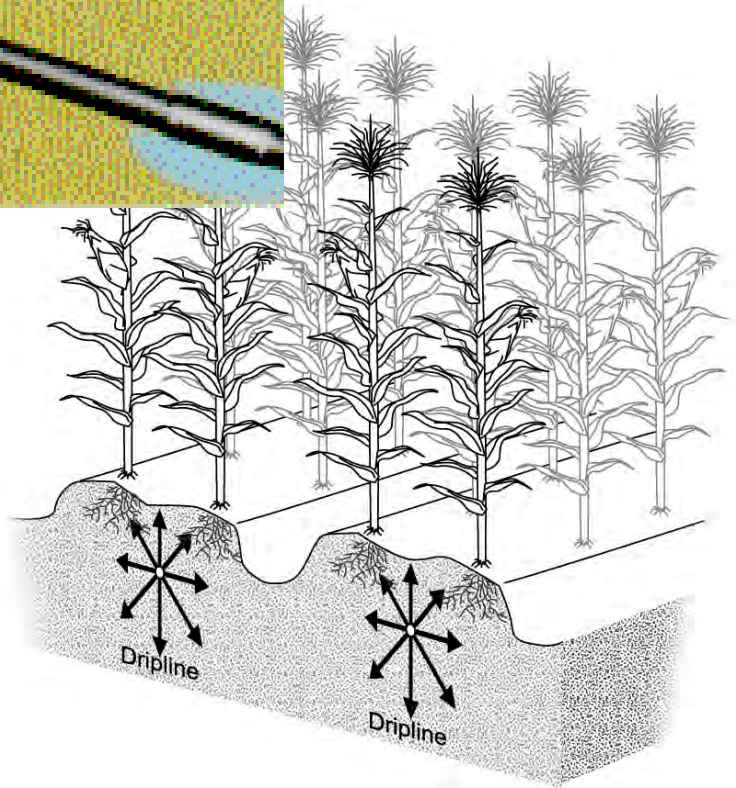
Tape







SUBSURFACE DRIP

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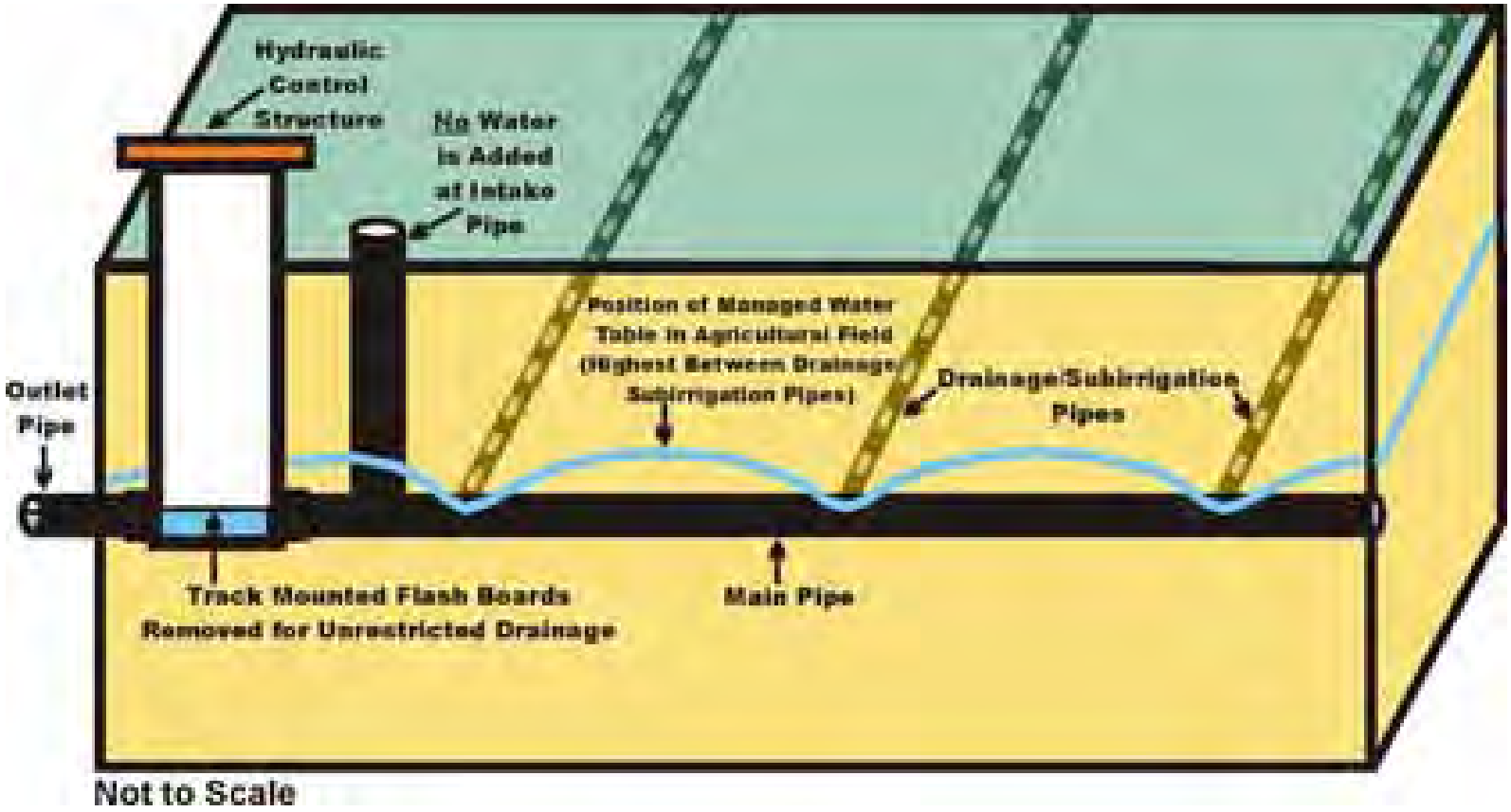
Reverse Drainage Irrigation



Stand pipe or ditch dam is used to build water level in dry season.

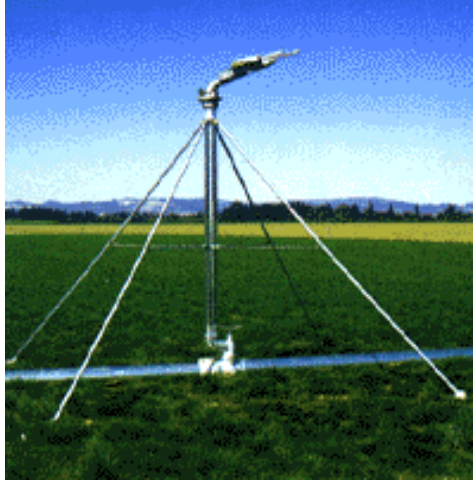
- Commonly drained heavy soils are slow to respond.

- Environmental benefit to limiting the time of year drainage is functioning.

Hand move

- Low start up cost for small scale field irrigation
- Full and partial circle options
- Advantage of solid set with option to move field between seasons
- High energy cost, low uniformity

Hand move



- Often used to fill in corners or square up fields
- In-line booster pump may be required - Requires 90 + psi
- Potential to lay-over crop

•Labor intensive

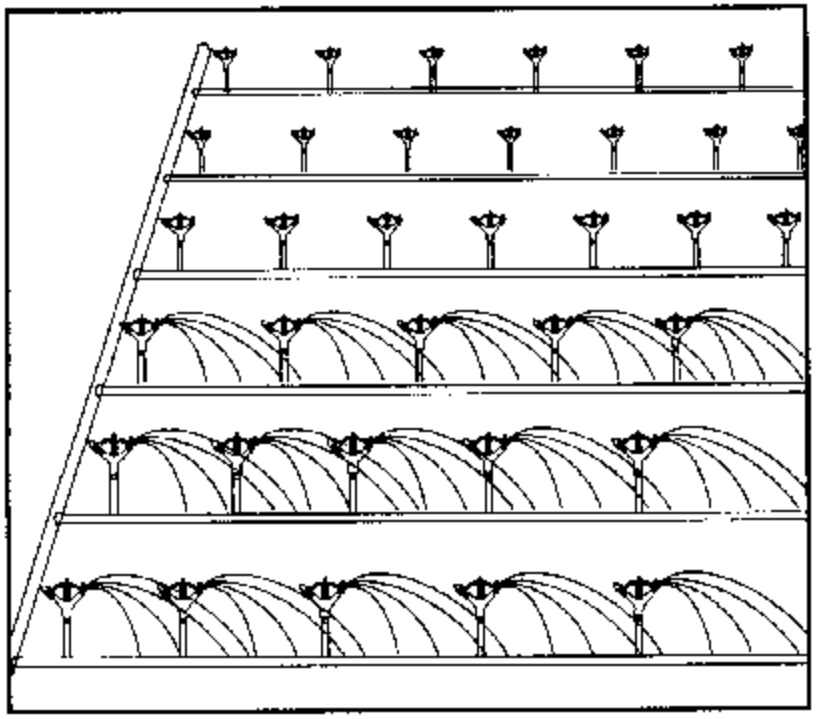
Solid set

- Allow almost immediate and continuous coverage
- Require medium to high psi
- High operating cost

Common in fruit and turf production where quick coverage and frost protection are a benefit.

Solid set

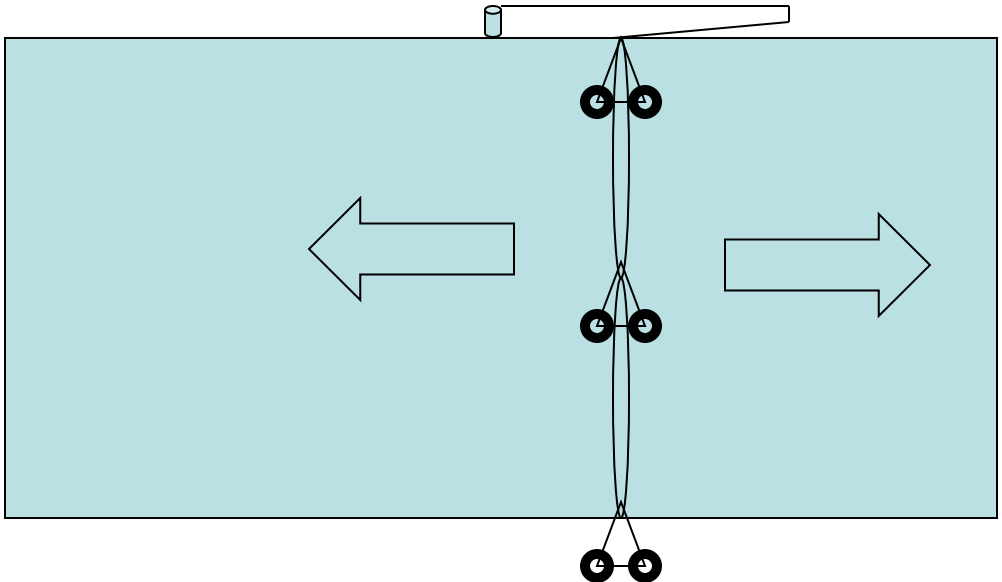
- Excels at truck crop irrigation.
- Flexible irrigation of subsets of field.

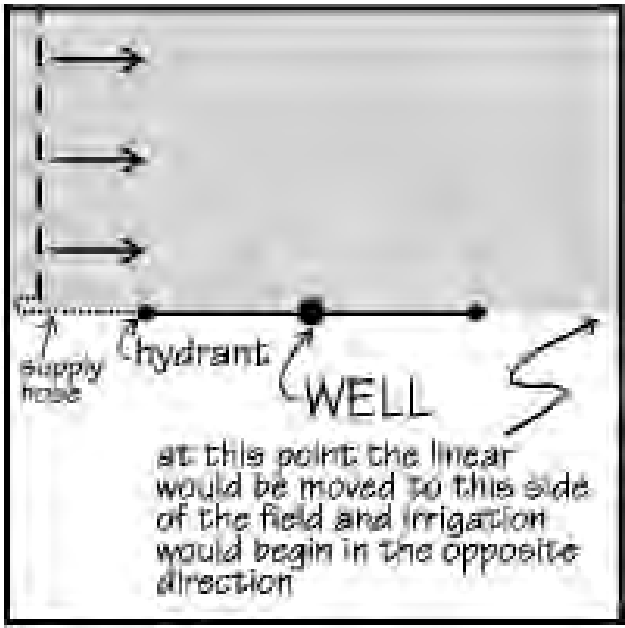


- High initial investment per acre on small plots.
- To keep uniform applications run time needs to increase as pressure decreases.

Linear Move

- Operates much the same as center pivot but center point is moved slowly forward with the rest of system following straight in line.
- Allow coverage of rectangles.
- Water source must move.



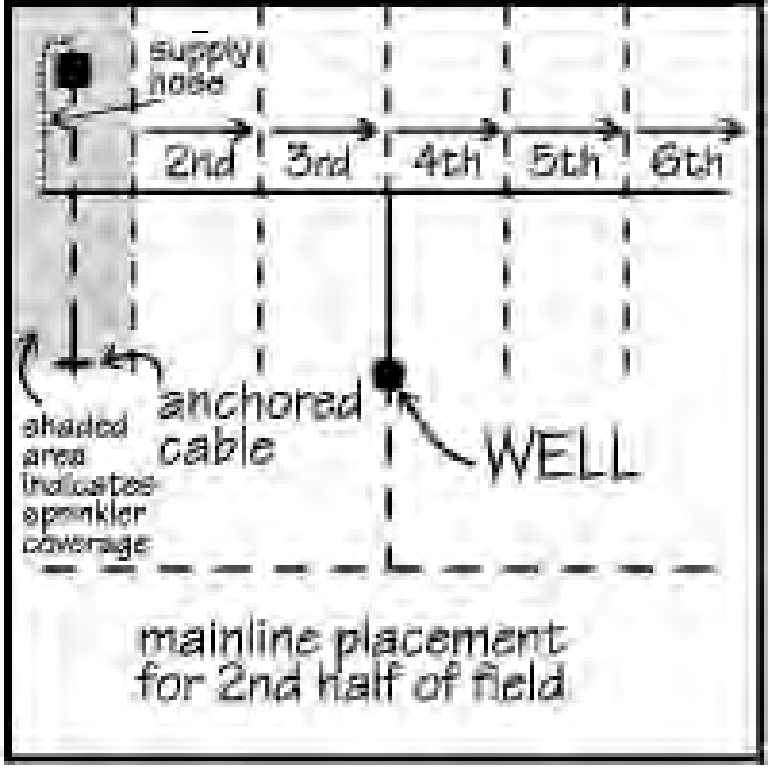


Linear Move

- Uniform coverage
- Avoids dry corners
- Researcher best friend
- Recommended when Length 2.5 x > width
- Increase labor over pivot due to hose move
- In general higher per acre cost than pivot.

Big Gun Travelers

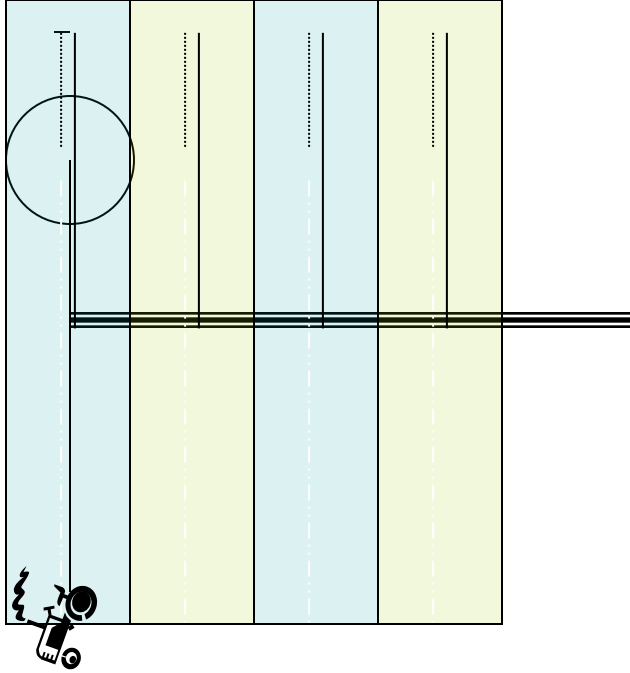
- Typical field layout is 300’ x 1320’ providing about 10 irrigated acres



- Distance between runs needs to decrease as pressure is reduced by distance

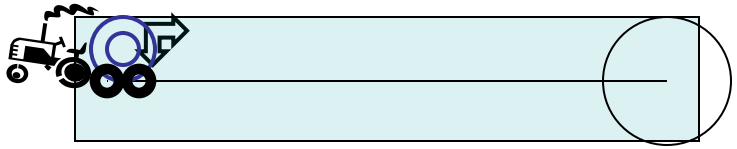
- Small amount of wind can compromise designed overlap

Big Gun Travelers

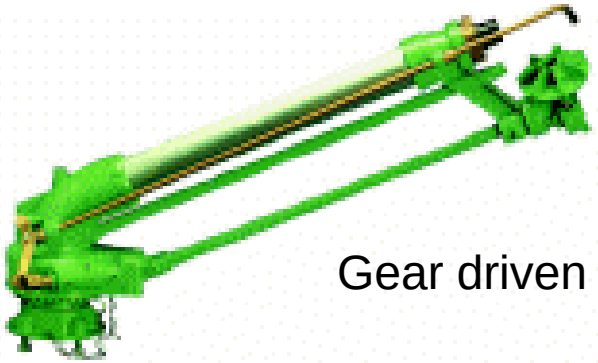


- Fairly standard design
- Flexible for future use in other fields
- Lots of used equipment available
- Limited hose life – replacement hose cost are often higher than used equipment cost

- High pressure requirements
- High energy and labor cost



Impact driven



Gear driven

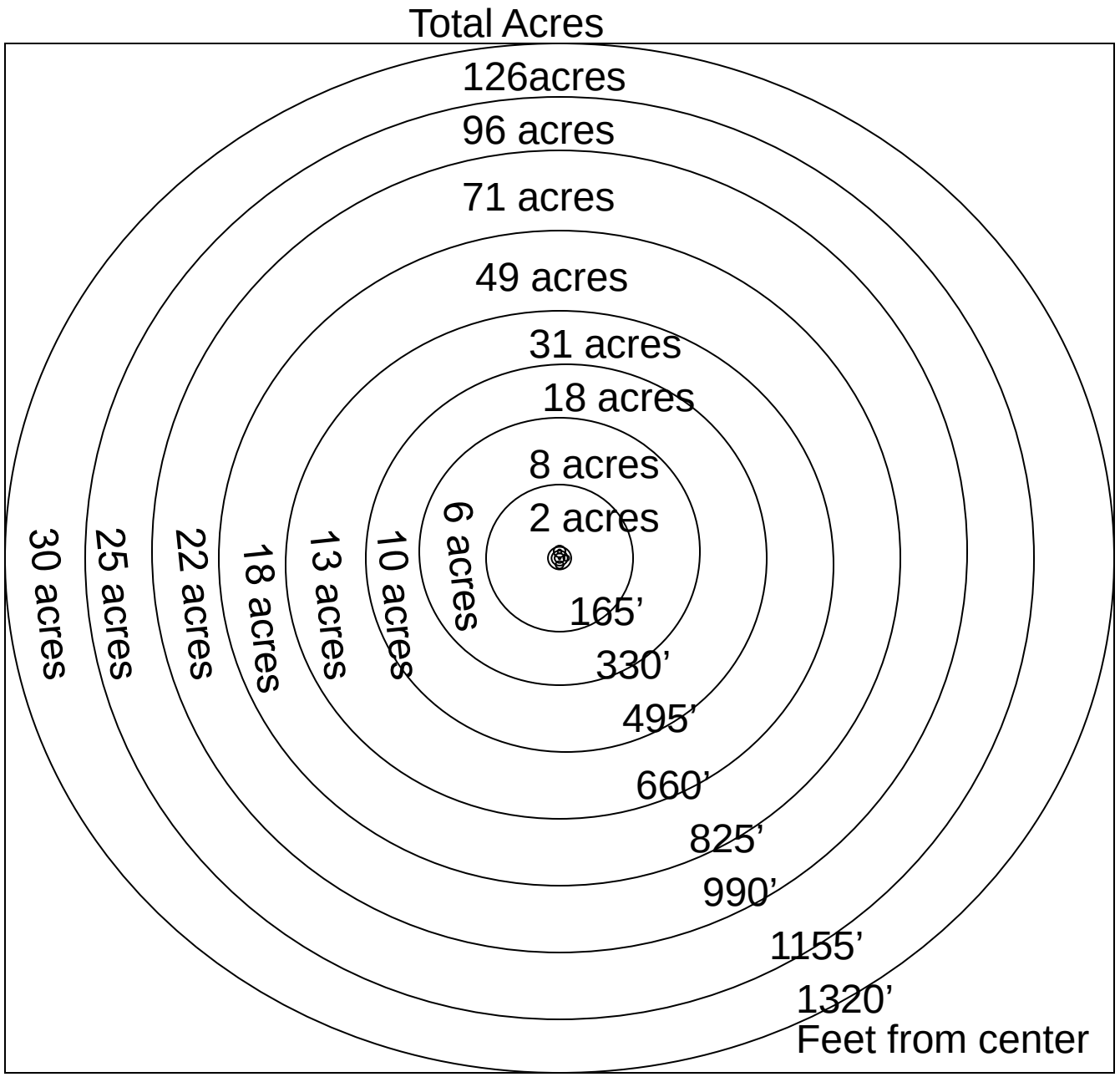
Hard and soft hoses available

Center Pivots

Over 80% of the irrigated acres are covered by center pivot irrigation

- Size and shape dependent
- Least labor and operating cost
- Most uniform and rain like coverage.
- Economics are size dependent

Center Pivots

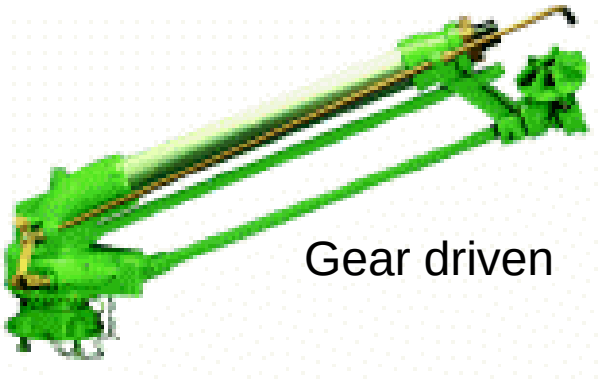


Center Pivots

- Spans lengths 154’ – 184’ common
- Spans lengths - shorter length and spans up to 205’ available, short obstacle can be spanned.
- Current system can run clockwise and counterclockwise making partial circle possible.
- May have higher initial cost/acre than many other options

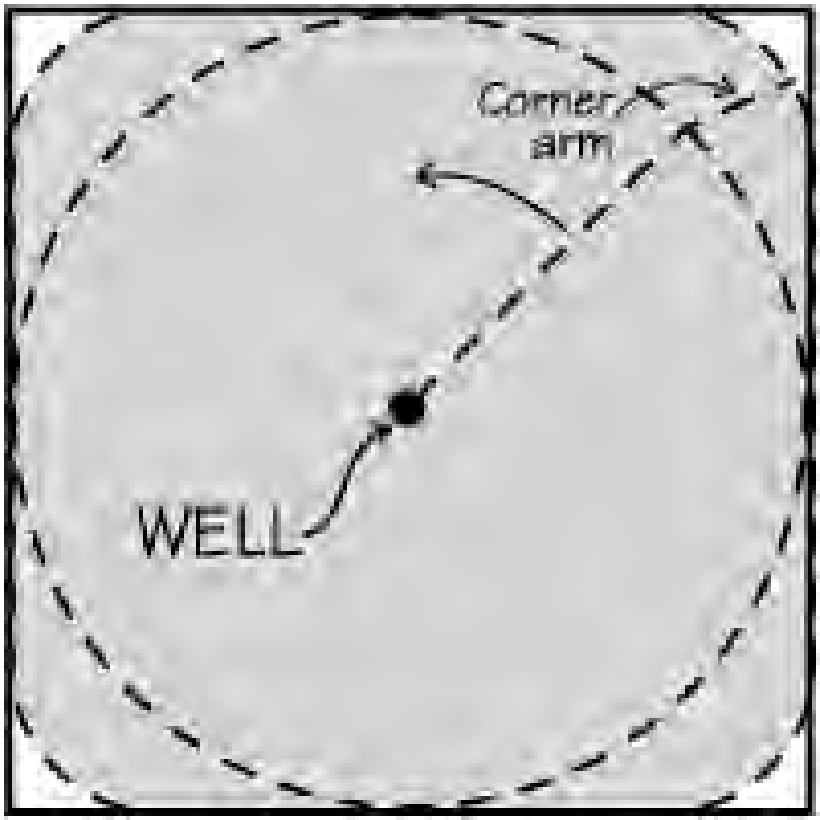
Center Pivots + End Gun

- Inexpensive coverage of field area beyond pivot length
- 80 to 100 psi needed for good coverage.
- Booster pump often used to increase pressure at the end gun (2,5 or 7 hp)



Center Pivots + Cornering System

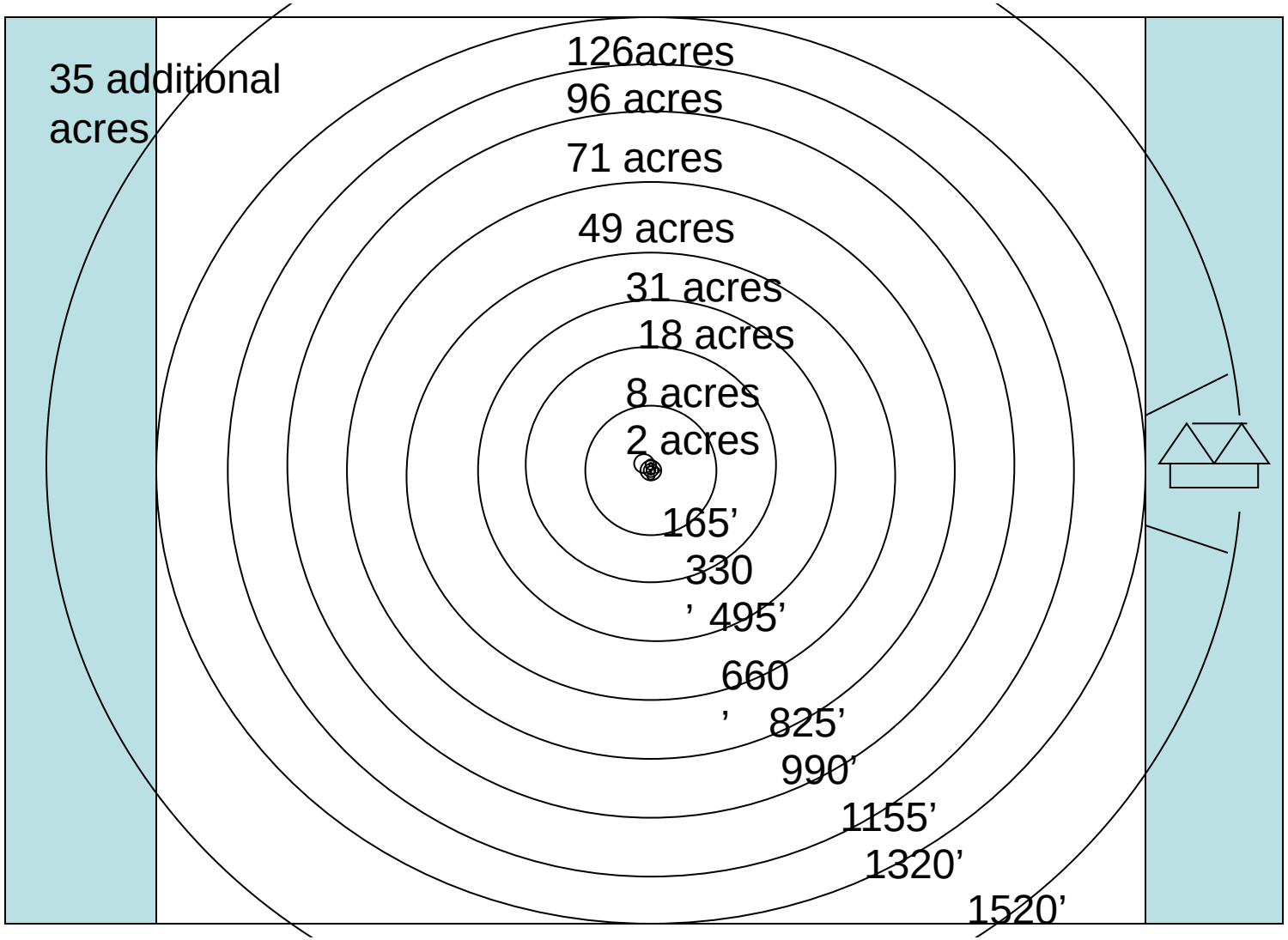
- Allows system length to expand by up to 200’ with a single arm or 350’ in a Z configuration.



Corner arms

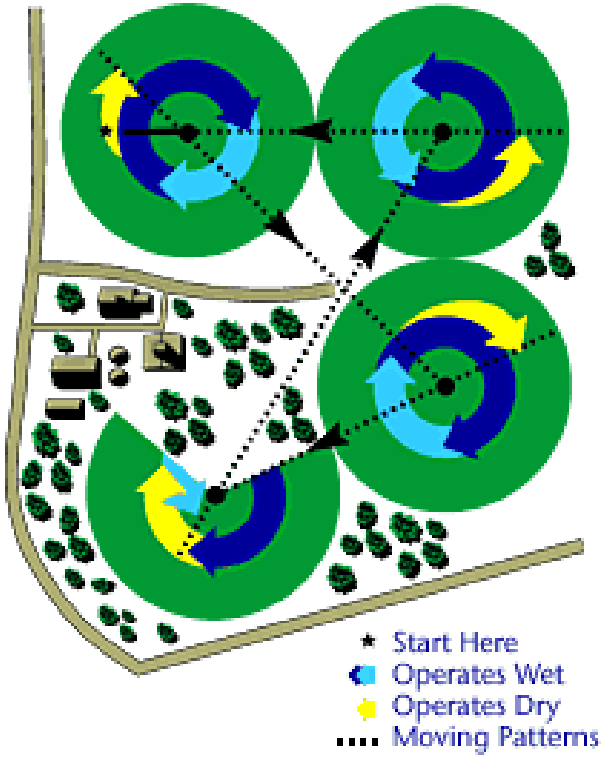
Added 53 acre if used 100% of time, 48 acre if used 90% of time

35 acre if used 66% of time.
18 acre if used .33% of time.



Tow-able Center Pivots

- Allow greater coverage by the same distribution equipment.
- Exactly matching circle and tow pattern must be planned.
- Total pump time and down time for towing the system need to be planned for.
- End tow system allow use in partial circles.



Consider two circle maximum per season
Tow each application cycle or annual tow.


1320’
annual tow