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MOBILE DRIP IRRIGATION (MDI)

----WHAT IS IT----

MOBILE DRIP IRRIGATION (MDI)

IS NOT ANOTHER TYPE OF SPRINKLER NOZZLE—***IT IS*** MOBILE SURFACE DRIP IRRIGATION

MOBILE DRIP IRRIGATION

TRANSFORMS

PIVOT IRRIGATION

THROUGH

DRIP TECHNOLOGY

MOBILE DRIP IRRIGATION

COMBINES THE

EFFICIENCY OF DRIP TECHNOLOGY

WITH THE

ECONOMICS AND ***FLEXIBILITY***

OF PIVOT AND LINEAR IRRIGATION

- A ***PLACEMENT*** OF DRIP TUBING THAT DRAGS BEHIND PIVOT IN PRECISE ROW PLACEMENT
- ***RANGING IN LENGTHS*** FROM 1' - 100' W/ PRESSURE COMPENSATING AND SELF FLUSHING EMITTERS.
- ***ADAPTS*** TO END OF HOSE, RIGID DROP, OR A MANIFOLD W/O SPRINKLER HEADS OR PRESSURE REGULATORS

(MDI) LARGE EMITTERS DRIPPING (1&2 GPH)

(MDI) MOBILE DRIP IRRIGATION OPERATING


MOBILE DRIP IRRIGATION WITH 30" MANIFOLD
DRAGGING BEHIND DRAGON-LINE ™ SYSTEM

RIGID DROP ASSEMBLY BY DRAGON-LINE™


PMDI™ SYSTEM WITH MANIFOLD ON TRUSS RODS


PMDI™ SYSTEM WITH
REGULATORS

- Water application is **precisely** and **uniformly distributed** directly to predetermined placement on soil surface.

- **Delivers** water and fertilizers directly to soil surface, not to foliage, not to wind

MOBILE DRIP IRRIGATION

BRINGS

PRECISE IRRIGATION

TO

PRECISION FARMING

MDI ALLOWS PRECISE IRRIGATION

Optional Winch Assembly by Dragon-Line™

- ***GERMINATION, CHEMIGATION, AND FERTIGATION*** ARE POSSIBLE IN CONJUNCTION WITH TRADITIONAL SPRINKLER HEADS AND NOZZLES

MDI SYSTEMS CAN BE COMBINED WITH CONVENTIONAL PIVOT IRRIGATION APPLICATION PACKAGES TO PROVIDE GERMINATION, CHEMIGATION, AND FERTIGATION.

MDI ADVATAGES

- ***ACCURACY*** WATER MANAGEMENT AND GREATER EFFICIENCY THAN STANDARD PIVOT NOZZLING (ACCURACY DOWN TO A NUMBER ½ SIZE NOZZLE)
- ***ACCURACY*** WATERING FOR SMALL WATER SYSTEMS (100-400 GPM)
- ***ELIMINATES*** OVERWATERING IN FIRST SPANS (REDISTRIBUTES SAVED WATER IN BALANCE OF SYSTEM)

- TRADITIONAL SPRINKLER HEADS DELIVER APPLICATION GREATER THAN 90% , ***BUT LOSES OCCUR AFTER WATER LEAVES THE NOZZLE DUE TO EVAPORATION, WIND, SUN, UNLEVEL TERRAIN, AND SOIL CONDITIONS***

EVAPORATIVE LOSSES DURING IRRIGATING ON A WINDY DAY ARE

ESTIMATED EXCESS OF 50%

- **ELIMINATES PLUGGED NOZZLES AND FROZEN PLUGGED DROPS DURING WINTER WATERING (1/2" TUBING WITH END CAP)**

- **DELIVERS AND SPREADS WATER** TO A LARGER AREA (USUALLY GREATER THAN 50%)
- **PROMOTES** LOW IMPACT AND BETTER INFILTRATION RATE

- **LOWER IMPACT APPLICATION:**
  KEEPS SOIL MELLOW WITH LITTLE OR NO SOIL COMPACTION.
  TRADITIONAL SPRINKLER HEADS CAN DEVELOP A HARDPAN DURING WATERING SEASON.

Mobile Drip Irrigation

DRAGON-LINE™ DUAL CABLE HIGH LINE SYSTEM

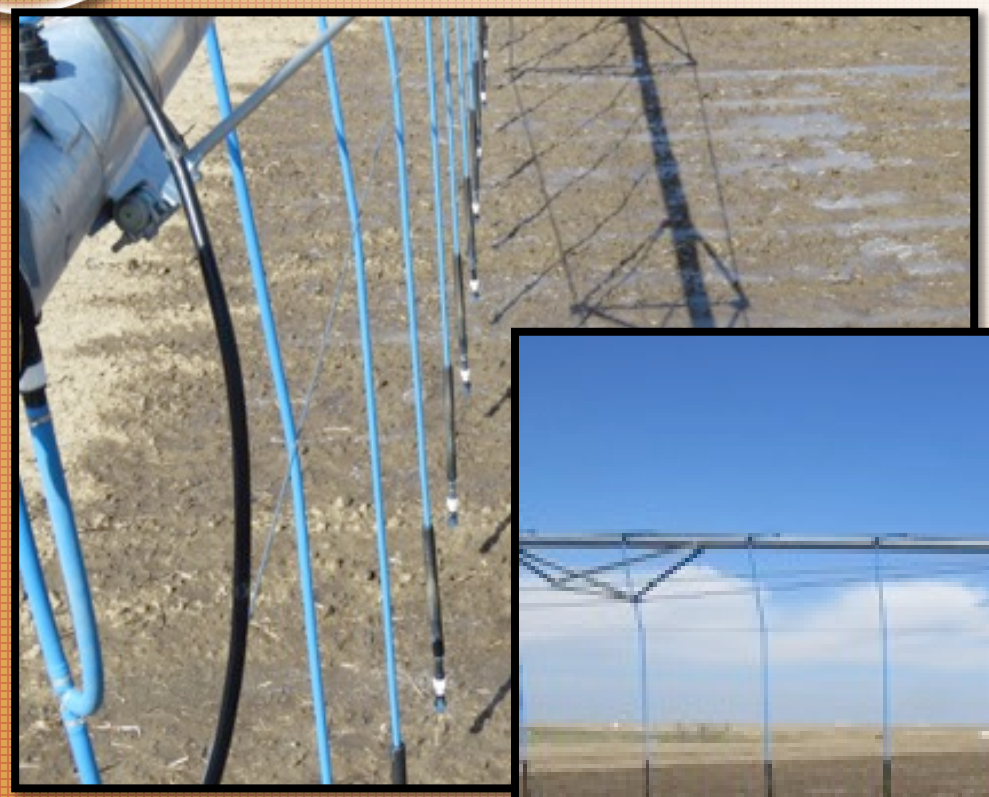
Potential Sources of Water Loss for Irrigation Systems

- Air Losses
  - Air Evaporation
  - Drift
- Foliar Losses
  - Plant Interception
  - Net Canopy Evaporation
- Ground Losses
  - Surface Evaporation
  - Surface Run Off
  - Deep Percolation

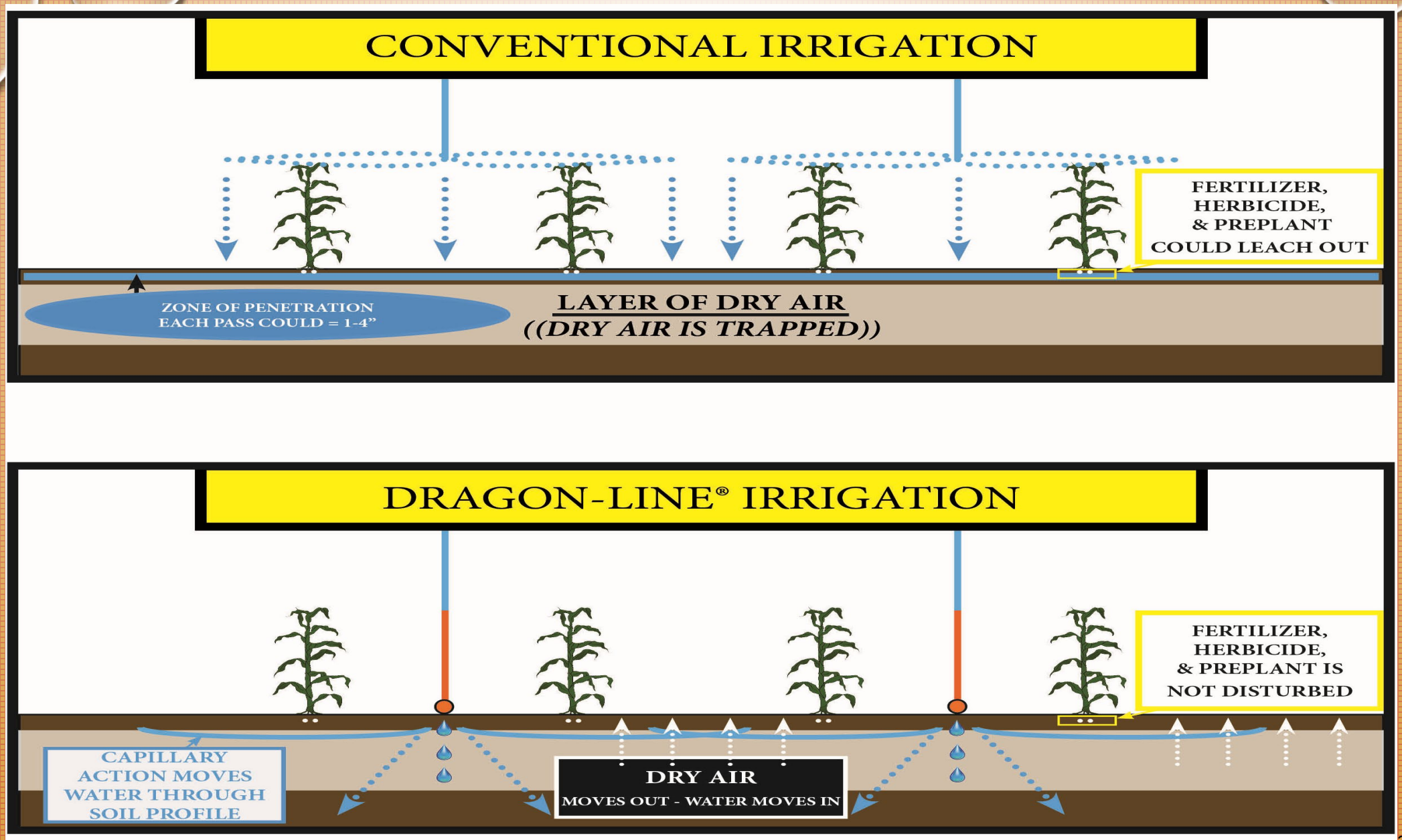
- **BANKS WATER** RATHER THAN EVAPORATING OR RUNNING IT OFF
- **INCREASES** SOIL MOISTURE

CONVENTIONAL SPRAYS

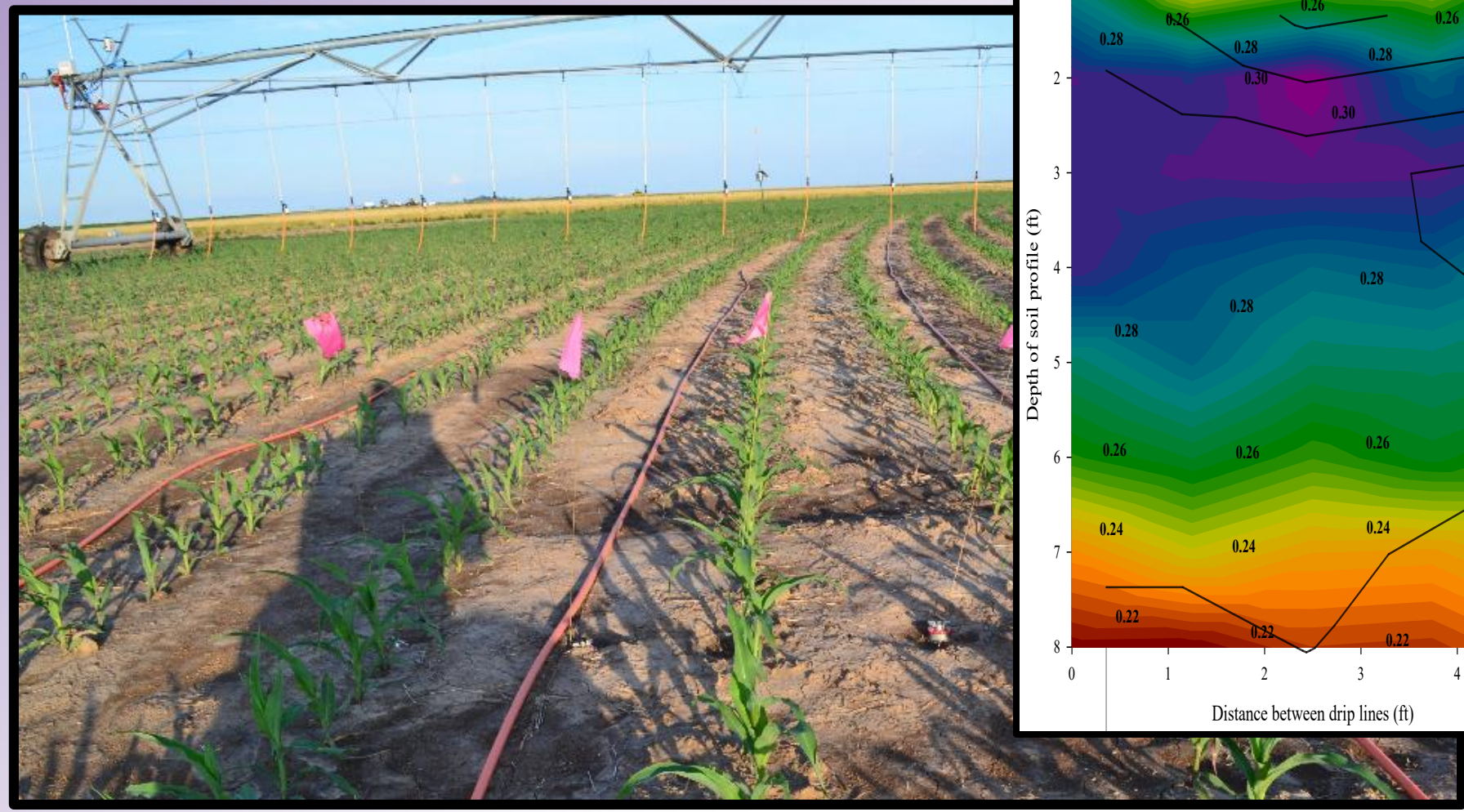
MOBILE DRIP IRRIGATION

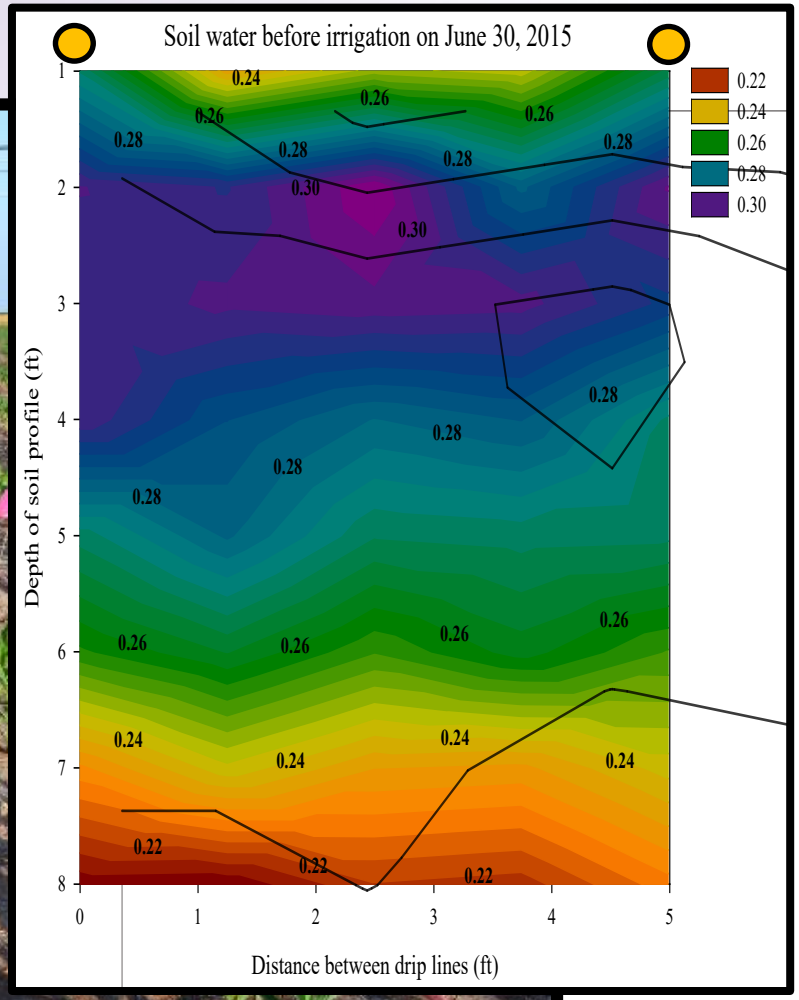


1.25”IRRIGATION APPLICATION



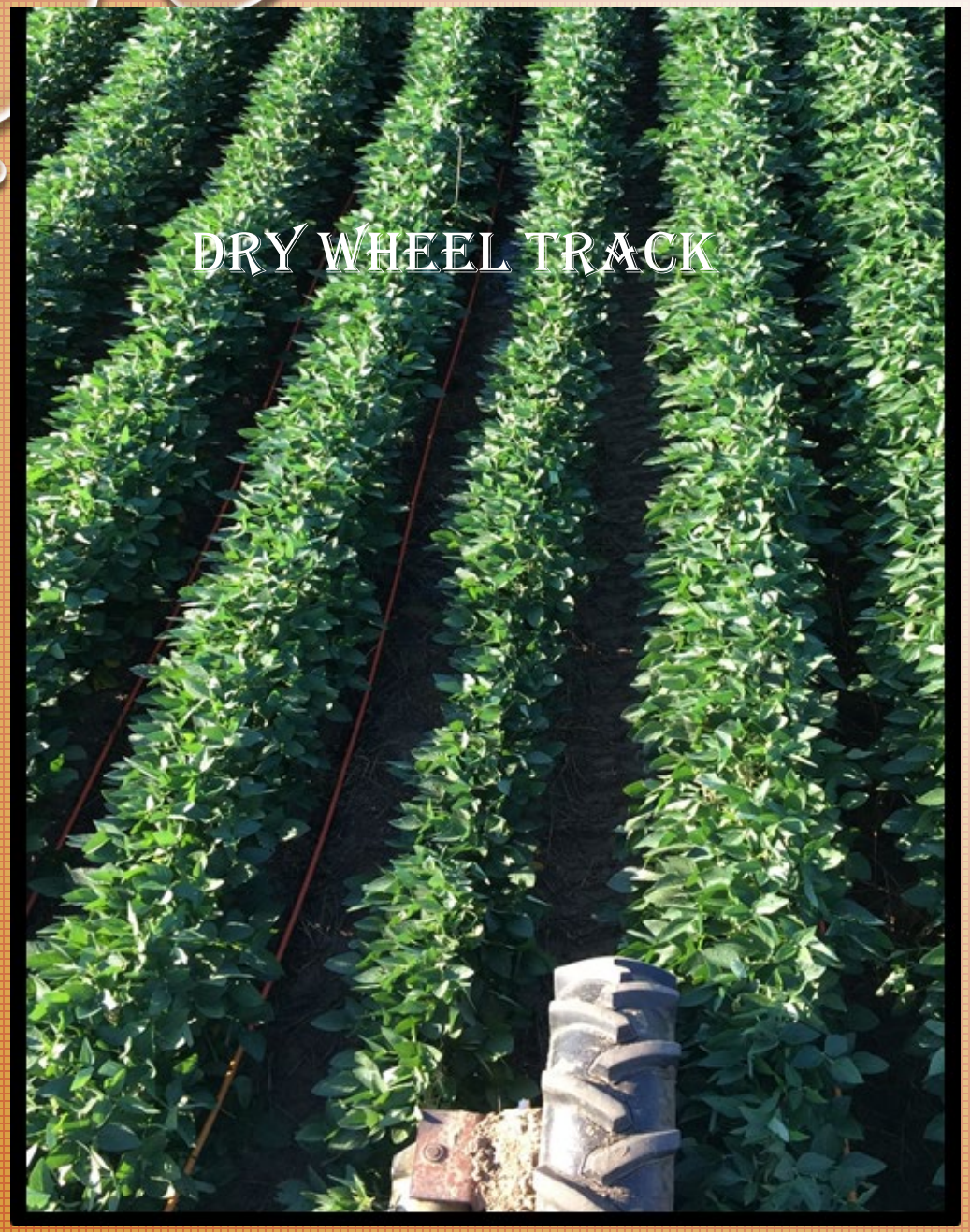
MDI ALLOWS WATER TO PENETRATE SOIL, MOVING DRY AIR OUT, PROMOTING CAPILLARY ACTION





Soil Water Redistribution Under 60 Inch MDI Spacing

- **Reduces** or **eliminates** wheel track problems and slippage of muddy tires
- **Reduces** power train wear and tear on gearboxes and motors


DRY WHEEL TRACK


END Of SEASON WHEEL TRACK

- **SAVES 20-50%**

OVERALL OF WATER APPLIED, ENERGY COSTS, AND PIVOT WEAR & TEAR

Evaporative Loss by Soil Texture & Irrigation Amount Surface Applied on Bare Soil

Applying 1.2" of water per irrigation then measure the loss

Readily evaporable water (1 to 2 days)

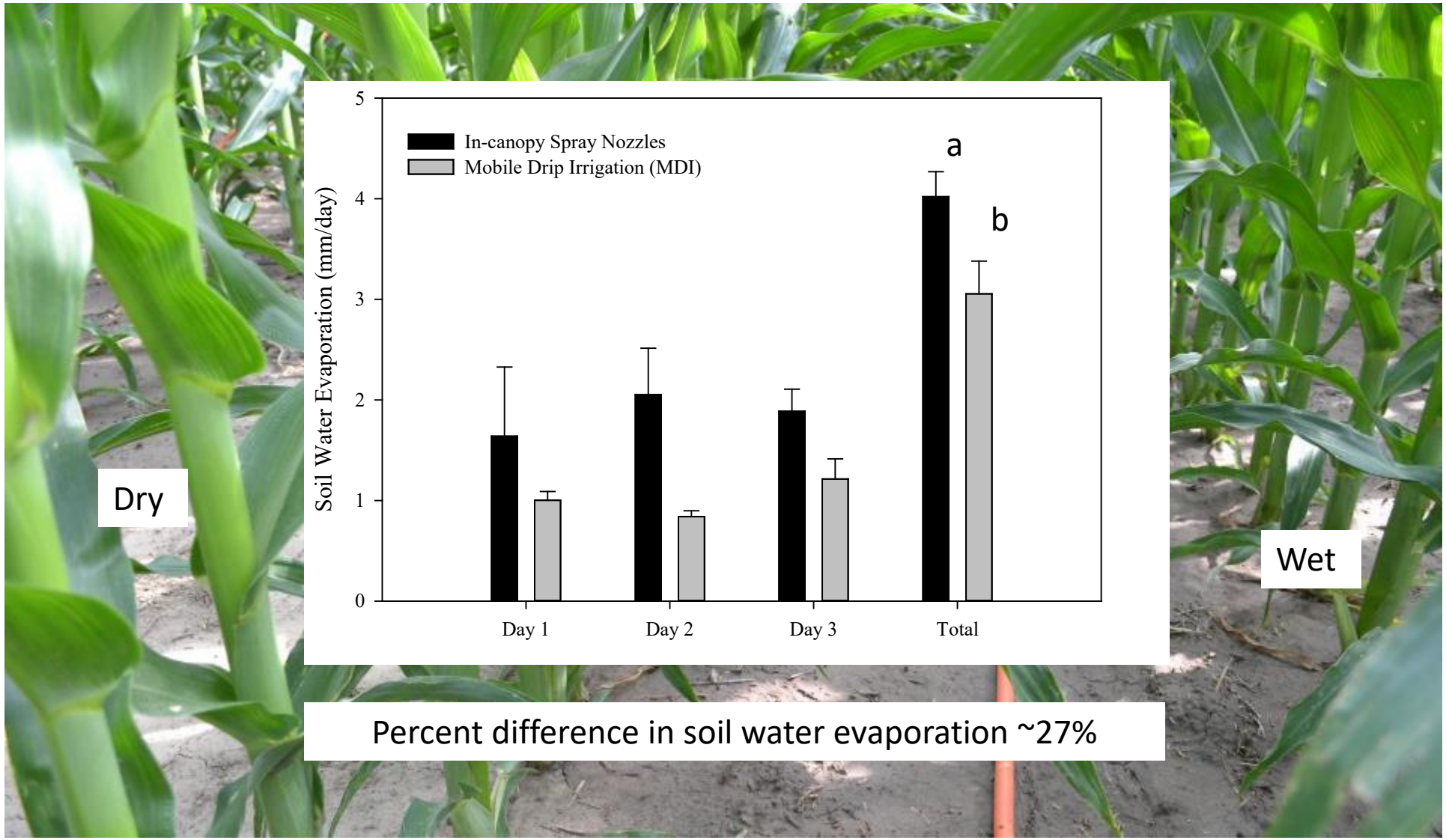
-Clay loam (Pullman) , Bushland 0.67 to 0.79 inch
-Silt loam (Ulysses), Garden City 0.60 to 0.70 inch
-Sandy loam (Amarillo), Big Spring 0.47 to 0.60 inch
-Fine sand (Vingo), Dalhart) 0.27 to 0.32 inch

Total evaporable water (on average)

47% loss of water with irrigation application more than 1.2 inches
72% loss of water with irrigation application less than 1.2 inches

Source: Tolk, J.A. and S.R. Evett. Field-measured, hourly soil water evaporation stages in relation to reference ET and soil to air temperature ratio. Submitted to Vadose Zone J.

Soil water evaporation under LESA and MDI (mm/day)



Percent difference in soil water evaporation ~27%

RESEARCHERS HAVE PROVEN THAT UP TO 50% PERCENT OF WATER IS LOST TO THE *ATMOSPHERE* EVERY TIME IT IS DISTRIBUTED TO THE SOIL SURFACE

DUE TO WIND, SUN, RUN OFF, NOZZLE ATOMIZATION, & EVAPORATION

KEEPING FOLIAR DRY

- **REDUCES** INSECT INFESTATION
- **REDUCES** FUNGUS AND DISEASE INTRUSION
- **ELIMINATES** LEAF BURN AND PLANT SHOCK DUE TO SUDDEN TEMPERATURE CHANGE
- **REDUCES** FERTILIZER, CHEMICALS, AND POOR WATER QUALITY ACCUMULATING ON LEAVES

PROPER DESIGN

IS KEY FOR A SUCCESSFUL ***MDI*** SYSTEM

- **PROFESSIONAL AND EXACT SPRINKLER CHARTS** PRODUCED BY **THE WISH GROUP AND OTHERS** FOR PRECISE WATER APPLICATION, DESIGN, AND PLACEMENT OF LINES

MDI DATA FORM

- MUST HAVE ALL INFORMATION ABOUT PIVOT SYSTEM TO BE CONVERTED OR DESIGNED
- MUST HAVE A COMPLETE WATER SAMPLE TAKE TO DETERMINE WATER QUALITY, ORGANIC AND INORGANIC CONTAMINATES, AND SAND SIZE
- MUST HAVE A SOIL TEST FOR SOIL TYPE
- MUST HAVE TOPOGRAPHY MAP FOR ELEVATION DIFFERENCES
- MUST BE AWARE OF ANY OBSTACLES PRESENT IN FIELD

DRAGON LINE® DATA FORM

Customer: Dealer: Date:

Legal: Serial #: Salesman:

System Brand: Model: Year: Wheel/Gearbox Ratio:

Dragon-Line: _____ GPM _____ PSI ☐ TOP ☐ END ☐ BASE of Pivot Motor HP: Motor RPM:

Germination: _____ GPM _____ PSI ☐ TOP ☐ END ☐ BASE of Pivot Tire Size: Elevation (+): Elevation (-):

DUAL NOZZLE OPTIONS:

☐ YES ☐ NO Dual Valve Assemblies, Using New Nozzles
☐ YES ☐ NO Dual Valve Assemblies, Using Customer Existing Nozzles
☐ YES ☐ NO Single 3/4" valves on the drops that do not have a DVA installed
☐ YES ☐ NO Senninger UP3 Nozzle Option ☐ w/Std Pad ☐ Adapter ☐ Carrier/Pad

☐HLSCS ☐HLDCM ☐HLDCR
☐LLSCS ☐LLM

FILTRATION:

☐ YES ☐ NO Cyclone or Sand Separator Filtration ☐ Adjustable Winch Cable Assy ☐ Fixed Cable Assembly :CABLE ASSEMBLY
☐ YES ☐ NO Screen Mesh Filter w/ 80 Mesh Insert
☐ YES ☐ NO Scanaway Manual Filter w/ 80 Mesh Insert ☐ YES ☐ NO : EXISTING NOZZLE CHART ☐ YES ☐ NO : SAND ISSUE
☐ YES ☐ NO Brushaway Manual Filter w/ 80 Mesh Insert ☐ YES ☐ NO : WATER SAMPLE ☐ YES ☐ NO : ORGANIC ISSUE

TUBING GPH & EMITTER SPACING:

☐ 2 GPH x 6" ☐ 2 GPH x 12" ☐ 2 GPH x 18" ☐ 1 GPH x 6"

span	Span Length	Pipe O.D.	Existing Outlet Spacing	Existing Outlets Used Per Span	Existing Drop Tube Material	Emitter Spacing On Tubing	Dragon-Line Spacing	Dragon-Line Outlets Per Span	Dual Valve Spacing	Regulator Pressure
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
O. H.										
Total Length			Total # of Outlets				Total # of Outlets			

Additional Notes, Directions to Location, Brand & Type of Filtration:

Soil Types Determine Row Placement

- Sandy soils require closer spaced row spacing and larger emitters if possible (24” – 30”) 3” – 6” emitter spacing
- Sandy loam soils wider spaced row spacing (30 – 60”) 3” – 6” emitter spacing
- Clay loam soils wider spaced row spacing (30” – 60”) 6” – 12” emitter spacing

Maintenance in season

- Check and flush end caps on dripper lines periodically
- Check and flush filers and sand separators as needed
- Inspect emitters for any plugging due to bacteria, organics, silts, etc.

Maintenance End of Season

- Flush out and drain filters and sand separators of any contaminates
- Inspect and flush out drip line end plugs
- Tie up dripper lines off ground to minimize rodent damage
- Open any single or dual valving present to avoid freezing and breaking damage

MDI CONCERNS

- ***120 MESH FILTRATION*** IS REQUIRED FOR SANDS, CONTAMINATES, AND ORGANICS THAT CAN PLUG EMITTERS (*REMEMBER, IT IS A DRIP SYSTEM*)
- ***WATER MAY NEED TREATED*** FOR ALGAE, ETC. (WATER SAMPLE TEST MUST BE TAKEN)
- MAY NOT BE ABLE TO GERMINATE, CHEMIGATE, OR FERTIGATE ***WITHOUT*** TRADITIONAL SPRINKLER HEADS OR VALVING OF SECONDARY SYSTEM W/SHUT OFF VALVES
- ***MANAGE*** DIFFERENTLY DURING HARVEST AND TILLAGE OPERATIONS
- MAY HAVE ***POSSIBLE RODENT*** OR ***ANIMAL DAMAGE***

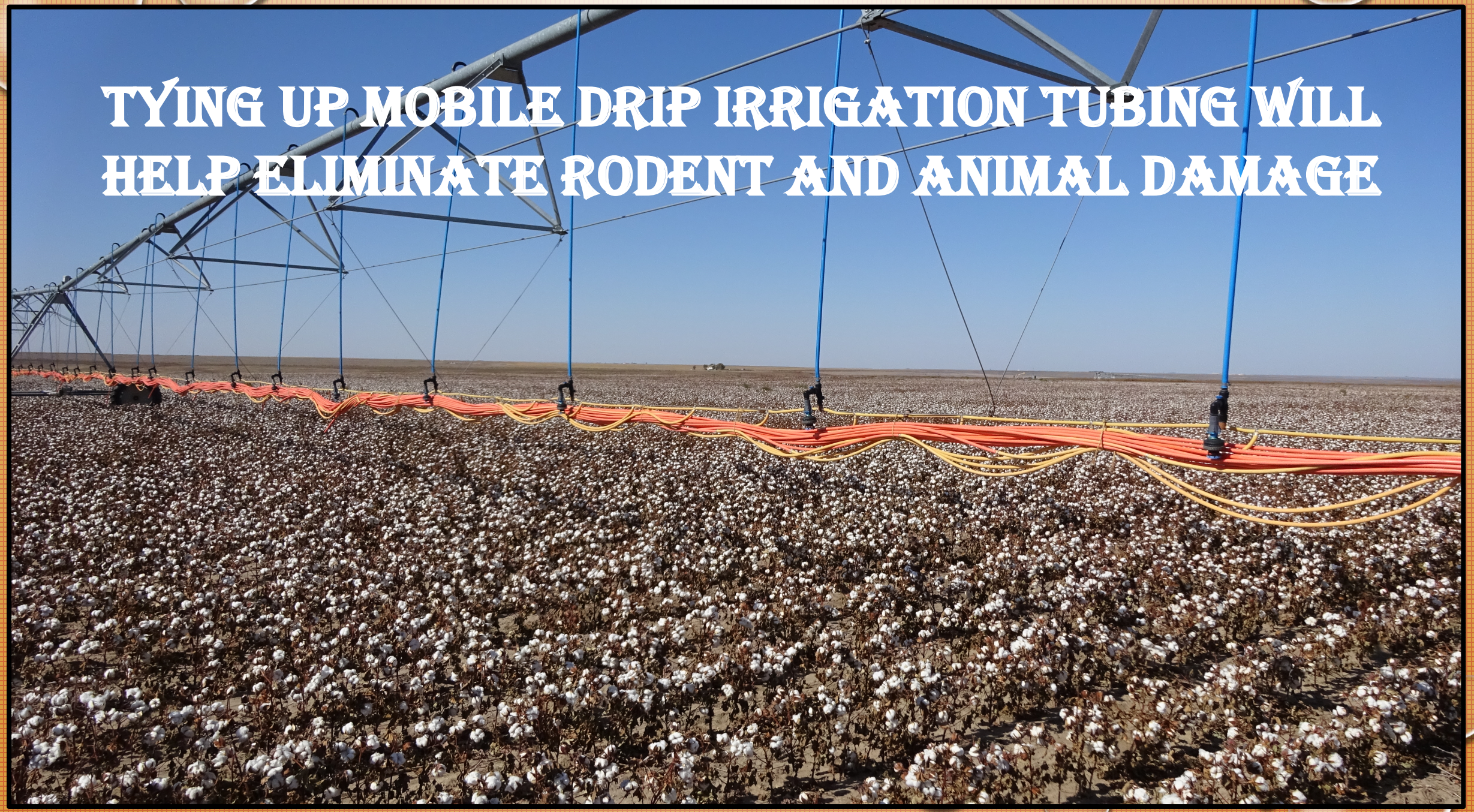
PROBLEMS CAUSED WITHOUT FILTRATION

FILTRATION METHODS

120 Mesh Filtration And A Water Sample Are Required On All Systems.
Filtration Methods Vary Based On Water Quality.

- AUTOMATIC
- SEMI-AUTOMATIC
- MANUAL

POSSIBLE RODENT OR ANIMAL DAMAGE


TYING UP MOBILE DRIP IRRIGATION TUBING WILL HELP ELIMINATE RODENT AND ANIMAL DAMAGE

Energy Savings

- Saving irrigation water pumped directly reduces energy requirements and costs
- Less labor costs and wear and repair of pumps and engines

Irrigation Pumping Costs

ASSUMPTIONS PUMPING PER YEAR

*150 Feet Of Lift (65 PSI)

*$.08 Electricity

*2000 Hours Running Time / Season

*1300 ft. 10” Pipe line

*No Elevation Changes

1000 GPM	900 GPM	800 GPM	700 GPM	600 GPM	500 GPM
$9213.00	$8031.00	$6927.00	$5895.00	$4927.00	$4015.00
GALLONS WATER PUMPED IN YEAR					
120,000,000	108,000,000	96,000,000	84,000,000	72,000,000	60,000,000

Saving 30% Irrigation from 1000 to 700 GPM per year Transforming to Mobile Drip Irrigation

$3,318 in 1 year ($2.50 Diesel =$8294/ 1 yr.) $33,180.00 in 10 years

36,000,000 Gallons/Year (110.5 acre feet) (329 homes/ Yr) 360,000,000 gallons/10 Years

$1000.00 - $2000.00 (less 80% Gearbox and Motor Repair/ Yr) $10,000-$20,000.00 / 10 Years

$750.00 Wheel Track Maintenance / Yr $7,500.00 / 10 years

$500.00 Nozzle and Regulator Repair/Yr $5,000.00 / 10 Years

Fertilizer, Herbicide, Chemical Savings???? $$$$$$$$

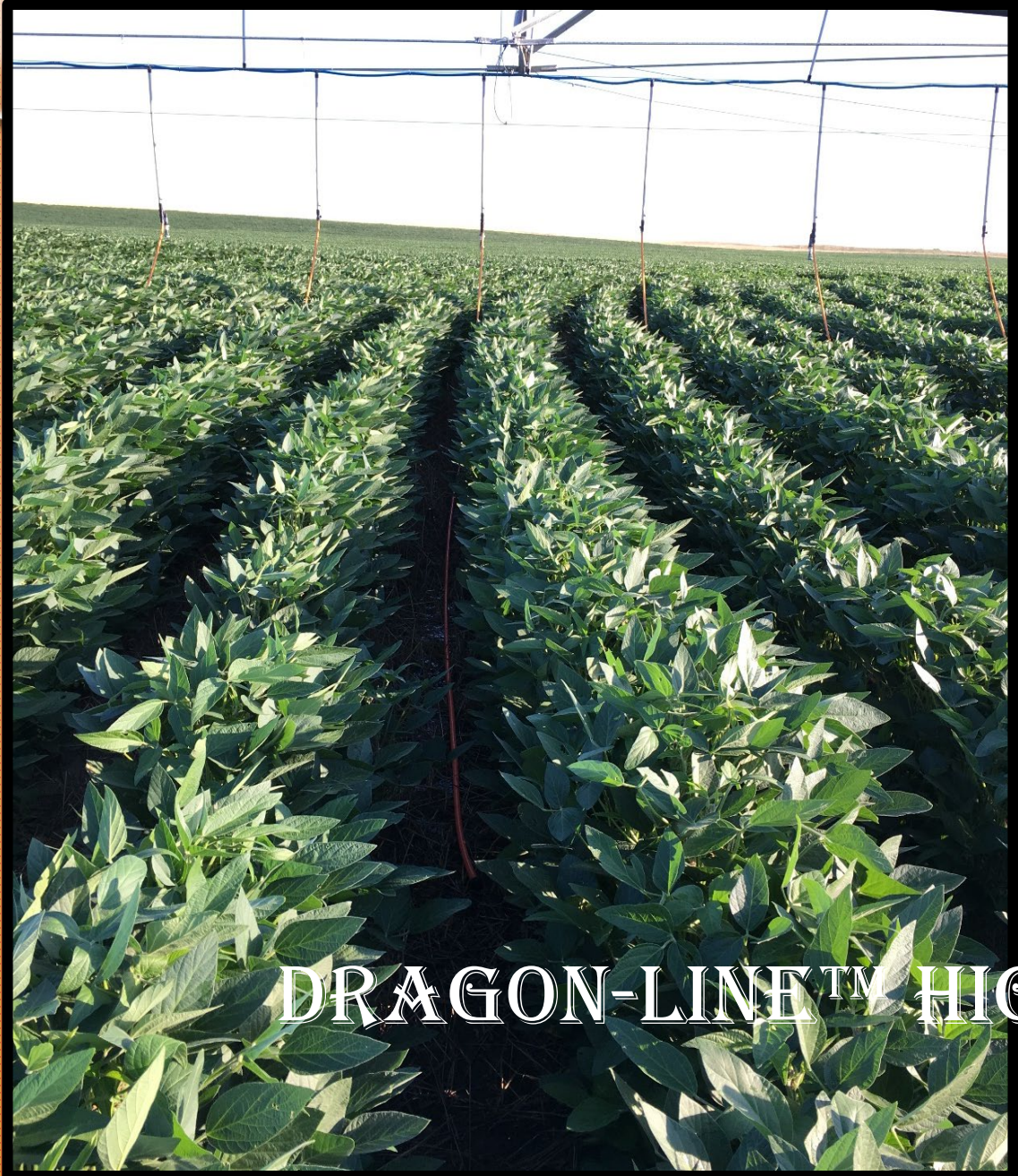
Conventional Irrigation –vs- Mobile Drip Irrigation

DRAGON-LINE™ 30" HIGH-LINE MANIFOLD DUAL SHUT-OFF VALVES ON 120"

COTTON MID SEASON WATERING
LOW-LINE SYSTEM 200 GPM-125 ACRE

Lubbock, Texas
90 GPM
Skip-Row Cotton
60 acres/Half Circle
80” Row Spacing

DRAGON-LINE™ SYSTEM
80" LOW-LINE SYSTEM W/1" SLEEVE



DRAGON-LINE™ HIGH LINE SYSTEM 30 & 60”

DRAGON-LINE™ WITH SINGLE CABLE LOW LINE SYSTEM


SOUTH AFRICA ADAPTING
DRAGON-LINE TO FIT THEIR FARMS

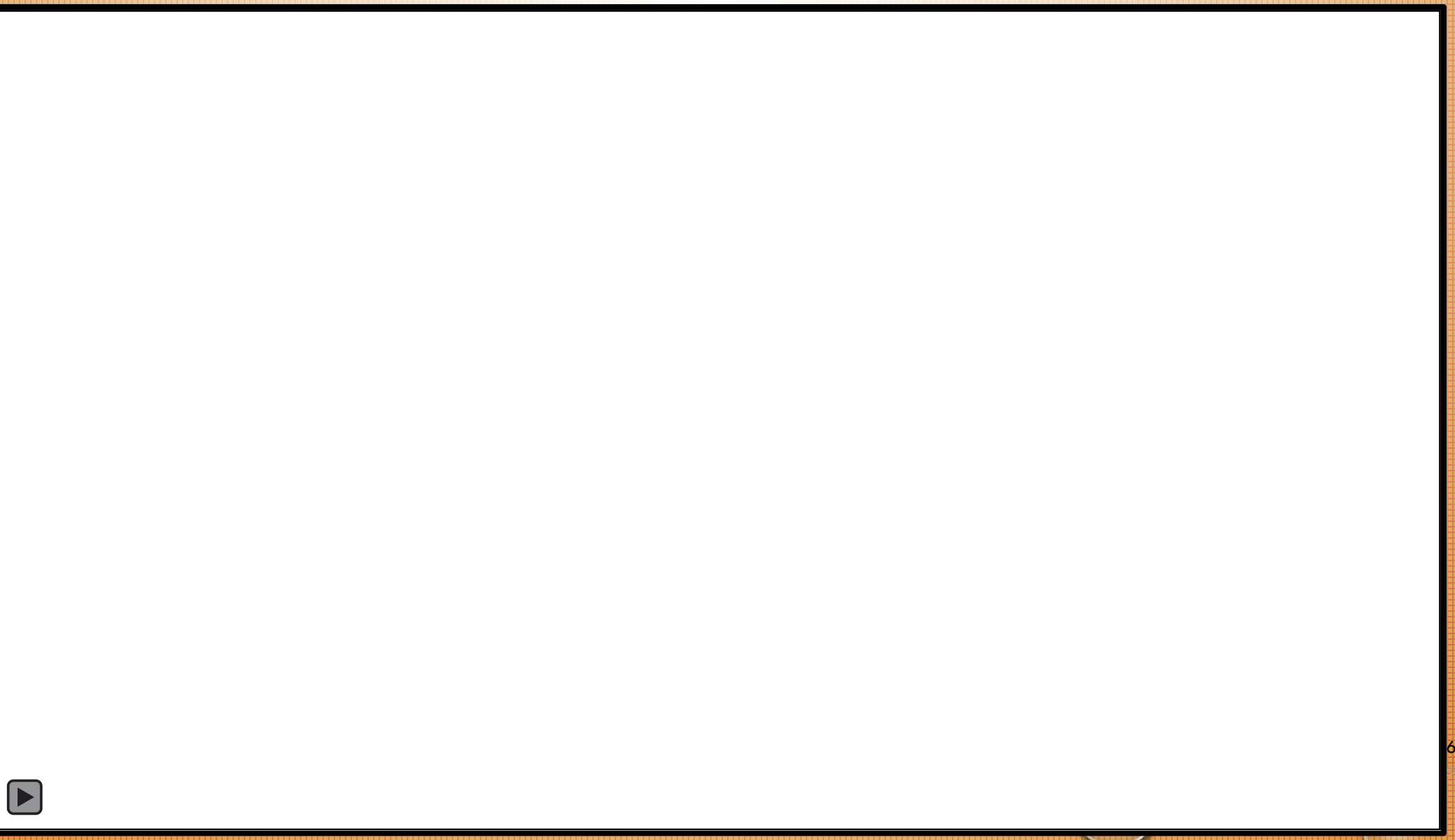
SOUTH AFRICA ADAPTING DRAGON-LINE™ TO FIT THEIR FARMS

TOMATO PLANTS
1 Row Tomato Per Bed
2 DRAGON-LINES Per Bed
Dragging Top Of Plants

Tomato Plants
1 Row Tomato Per Bed
2 Dragon-Lines / Bed
Dragging On Top Plants


Tomato Plants
1 Row Tomato Per Bed
2 Dragon-Lines / Bed
Dragging On Top Plants

Mobile Drip Irrigation Pulling Through Potatoes

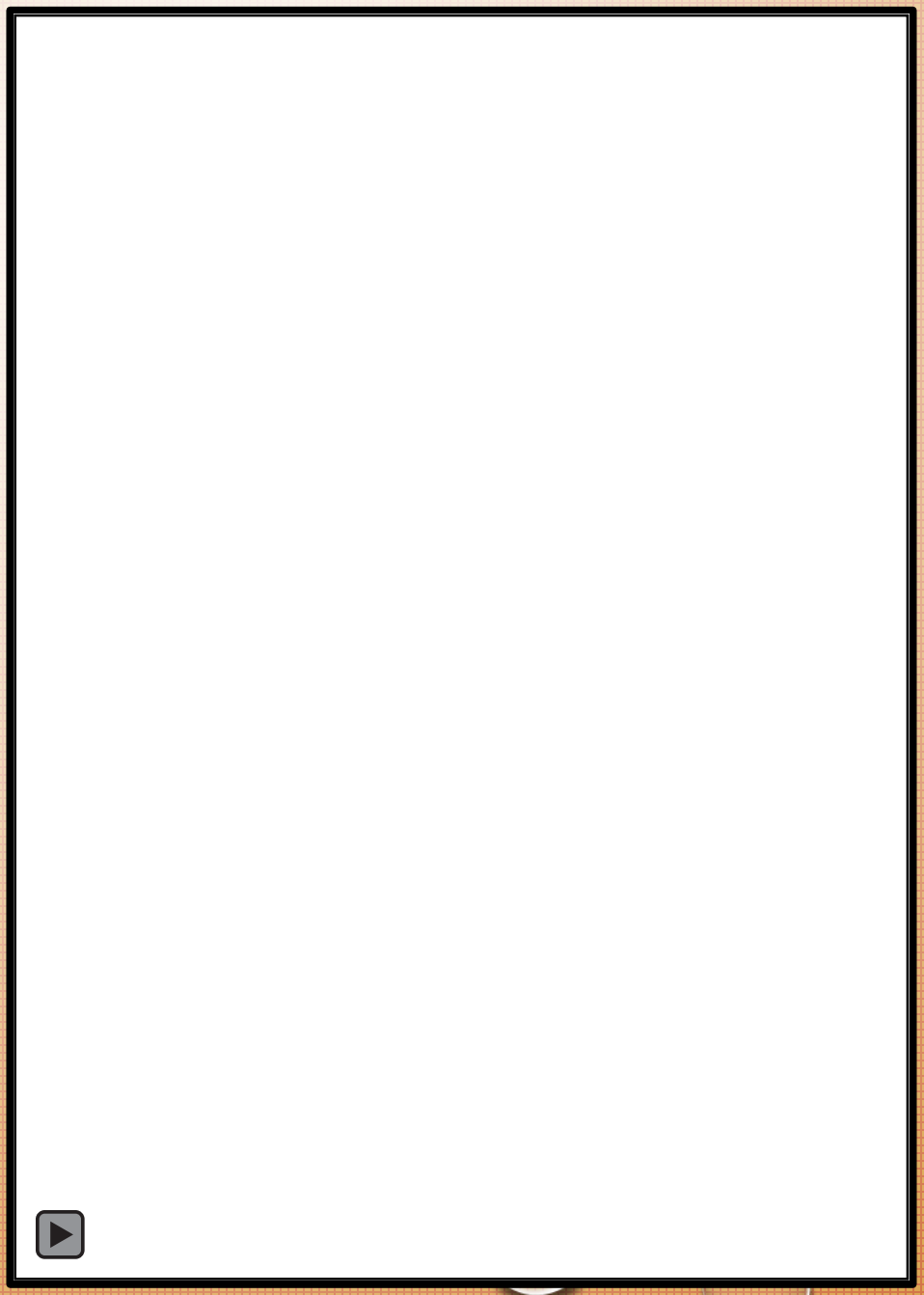


POTATOES

POTATOES IN SOUTH AFRICA

Onions in South Africa

Dragon-line™ watering center of beds




SAUDI ARABIA ADAPTING
DRAGON-LINE™ TO FIT THEIR FARMS

Chihuahua, Mexico adapts Dragon-Line™ to fit their farms

TAZMANIA, AUSTRALIA ADAPTS DRAGON-LINE™ TO FIT THEIR FARM

Thank You!

QUESTIONS FOR PANEL

LOREN SEAMAN

CROP CONSULTANT 40 YRS PLUS SW KANSAS

JACQUES WILLEMSE

3RD GENERATION FARMER SOUTH AFRICA

BOB JOCHENS

PRESIDENT OF WISH GROUP DISTRIBUTION