

Precision Irrigation Technology A Global Model

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Maximizing the Planet's Resources Through Technology



2 Earth Dilemma !

Our population is growing by >100 million/year
By the 2050 we will have 9 billion people
4.9 bil. Ha. in Agriculture, 1.4 bil. Ha. is Arable land
To feed this many people you may need 2 earth





1 bil = 1804 2 bil = 1927 3 bil = 1960 4 bil = 1974 5 bil = 1987 6 bil = 1989 7 bil = 2011 : 9 bil = 2050



Global Irrigation

- 17% of world agriculture is irrigated
- Irrigation is responsible for 40% of production
- In most countries 90% of water is used for irrigation. Competition for water is growing
- Flood irrigation is most widely used system
- Globally groundwater are declining rapidly
- Average global irrigation efficiency is 38%

Irrigation Market Demands



New Global Focus : water management and profitability

- Trends toward much larger irrigated farms
- More Integrated and market driven farms that owns part of the supply chain
- Well engineered irrigation systems
- Much reliance on technologies for highest yield
- Fully incorporate sustainability as a profit center
- More crop diversifications
- Promotes Value-add food processing as an engine of the economy

Global Model: Columbia River Basin High Yielding -Large scale Farming

- Over 80 different crops
- Highest Yields of crops in the US
- 80% of farm products is for export



Global Model: High Yielding -Large scale Farming Columbia River Basin



Precision Irrigation : New Technology Approach

- Technologies with significant improvement in water use efficiencies
- Meeting global demand for affordable food
- Results in high yielding crop, creates economic growth, decrease poverty

Precision Agriculture VS. Precision Irrigation

• **Precision Agriculture:**

– GPS based technologies focused on Mechanized Tractors, Planting, Cultivation, Harvesting, etc.





Precision Irrigation

- Focus on GPS water technology and as important
- Rapid development of sensor technologies
- Save water and energy resources,
- Transfer saved water to increase irrigated land
- Save in Fertigation, Chemigation, Herbigation, Labor

Precise Irrigation Design System

Top Photos: 15,000 hectare project



"Optimizing Water Resources Through Technology"



Bottom Photos: 3000 hectare project



14 x1 MW pumping station (18000 Horsepower) with flow rate of 30000 m3/hour (132000 gpm)





Electrical Panels, Variable Frequency Drive



ICDC Design: Irrigation Cluster Distribution Center "Chemigation, operation and cost efficiency"





- -A central Chemigation tanks for 4 to 5 pivots
- Central Location for all Filtration
- Central location for injectors (shared)
- Central location for all power transformers



VRI- Variable Rate Irrigation

- VRI allows different amounts of water to be applied to each part of the field
- Achieved by individual control of the sprinklers by pulsing, while also controlling the travel speed of the system
- This modifies the application depth along the length of the Center [ivot



VRI Components

- 1. VRI Main Controller
- 2. Wireless Nodes
- 3. Latching Solenoid Valves
- 4. Wiring Loom
- 5. GPS

VRI: irrigate only the areas with crops



IRZ Integrated Water Management Services

Using real-time Soil Moisture sensors (transmit every 30 minutes), real-time Weather Stations, Crop Modeling (ET) Soil, and Wireless Technologies to maximize efficiency and Profitability (\$) 3000 sensors over 100,000 HA.

Water Savings: 10%-15%
Energy Savings: 10%-20%
Saves Fertilizers/ Increase yield
Saved 10 Billion Gallons Water/Year
Saved 35 Million Kwh Energy/Year



Global Real-Time, Soil Moisture Monitoring and Crop Evapotranspiration Services = maximize yield, save water & energy



Real-Time Weather Station and Crop Evapotranspiration



Satellite based weather station provide site specific weather, crop water usage (ET) based on your crops planting schedule using your site specific weather parameters.

IRZ Daily Crop Water Use

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IRZ Center Pivot Report

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Energy and Water Usage and Cost Tracking

Tracking of Energy and Water Usage is essential in determining the actual energy cost per increment of water applied to a field, thus allowing the ability to determine cost benefits for irrigation water applied to a field.





Tracking of:

- Energy use for irrigation systems
- Irrigation water pumped
- Irrigation applied to each field
- Cost per acre-inch of water applied
- Hours of operation
- Seasonal irrigation benchmarks



IRZ Aerial Infrared Service



FieldNET Wireless Technologies



- Platform that monitors and controls pivot & drip irrigation systems
- Web-based software with supporting mobile Apps
- Proprietary controls and telemetry hardware
- Integrates with pumps & sensors

WIRELESS Broadband for SmartFarm



- IRZ designs and engineers a multi-purpose Broadband Wireless with 100's to 1000's times the capacity of "radio" or cellular phone
- Wireless Network is Private, secure and standards-based.
- Compatible with center pivots, pumps, weather stations, video for security, asset tracking and any Internet connected device.