IRZ Engineering Solutions
Global Irrigation Trend & Technologies

Design-Build-Manage
Since 1984
Contact Fred Ziari : 541-571-1111
FRED ZIARI
Founder and CEO

Experience: 40 years as a global leader in water resource/Irrigation technologies. He is recognized as an innovator and water management technology leader. Award: OSU Agriculture Hall of Fame, Weatherford Entrepreneur of the year, Founder of Farmers Ending Hunger.

Founders: Founded:
1) IRZ Consulting & Engineering, 2) EZ Wireless
3) Zeco, 4) OnSmart Technologies
2 Earth Dilemma!

- Our population is growing by approx. 100 million/year
- By the 2050 we will have 9.8 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 = 1999
7 bil = 2011
8 bil = 2022
9.8 bil = 2050
Irrigation Market Demands

- Water Use Efficiency
- Biofuels
- Food Security
- Environmental Improvement
Global Irrigation Trend

- 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%
New Global Trend:
water management and profitability

- Trends toward much larger irrigated farms
- More integrated and market driven farms owning part of the supply chain
- Well engineered irrigation systems (allows better water management)
- 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
USA irrigation 61 million acre

**TOP IRRIGATED STATES:**
- California / Texas / Nebraska / Idaho / Colorado / Arkansas / Oregon / Washington
- Majority of U.S. irrigation withdrawals (83 percent) are in the 17 Western States (west of solid line in map above).
- Surface water is the primary source of water in the arid West, except in Kansas, Nebraska, Texas, where more groundwater was used.
Leading the world in Sustainable Irrigation Technologies.

A US and Global Model
Global Irrigation Model: Columbia River Basin

High Yielding - Large scale Farming

- Over 100 different crops
- Highest Yields of crops in the US
- 80% of farm products is for export
- 95% Irrigation Efficiency (pivot/Drip)

Columbia Basin
Global Model: Sustainable Irrigation / Large Scale / High Yield

Washington Irrigation 2m ac (815k HA)

Oregon Irrigation 1.97m ac (800k HA)

Columbia River Share of Irrigation:
- Idaho 4%
- Washington 2.7%
- Oregon 0.3%
Water Management: Real time soil moisture sensors

- Moisture sensors
- Data every 30 minutes

Satellite Antenna

> 80% farms use service

MS Azure Server and APPs

- When to irrigate
- How much to irrigate
- How many hours to run pump

Weather Station

Farmer’s smart phone

>1 meter depth
>5 Moisture sensors
>Data every 30 minutes

Moisture Sensor from farms
IRZ Integrated Water Management Services-
Maximize Yield and conserve water and Energy

• **FieldSense**: Real-time Soil Moisture sensors (every 30 minutes), real-time Weather Stations, Crop Modeling (ET)
  • 3000 sensors over 100,000 HA.
  • Conserved Water Transfer

• Water Savings: 10%-15%
• Energy Savings: 10%-20%
• Saves Fertilizers/ Increase yield
• Saved 10 Billion Gallons Water/Year
• Saved 35 Million Kwh Energy/Year
EID Project-Oregon: High efficiency irrigation system

Design-Build-Manage 2020

- 20,000 acres
- Columbia River Pump Station
- Construction 2019-2020
- 78” (2m) to 66” (1.7m) FRP pipe
- 20,000 (15MW) horsepower
- Public work tender documents
- $53m

3D Design: 100,000 gpm / (20,500 m3/h)

River Pump Station

8 miles 78” pipe

EID Boundaries as of June 2016
EID Pump Station 2020 – 10 x 2000 HP, w/Variable Speed Drive

2000 Horsepower
98% efficient

76” FRP Pipe
IRZ Design: Very Large Pump Station

14 x 1 MW pumping station (18000 Horsepower) with flow rate of 30000 m³/hour (132000 gpm)
Fish Protection: State of the Art Intake Screening

60,000 M3/hr (262,000 gpm) Oregon, USA
FRP: Large Diameter Pipe and Pressure Class For Irrigation

- New Pipe technology
- 100+ years life
- Very energy efficient
- No corrosion
Precision Agriculture:  **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
Variable Rate Irrigation (VRI)

- VRI allows different amounts of water to be applied to each part of the field
- Achieved by individual control of the sprinklers, while also controlling the travel speed of the system
- VRI apply different amount of water along the center pivot:
  - Multiple crops on the same field, different soil type, avoid wet areas, etc.
Energy and Water Usage and Cost Tracking

Weekly tracking of Energy and Water Usage is essential in water management reducing costs

**Tracking of:**
- Energy use for irrigation
- Irrigation water pumped
- Irrigation applied to each field
- Cost per acre-inch of water applied
- Hours of operation
Aerial Infrared Service: to detect issues early warning

Nozzle Problem
Wireless Remote Monitoring and Control 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 Control
Projects from around the World

Global Irrigation Engineering and Water Conservation Project
Design Projects around the world

3500 ac “Design-Build-Operate” Project – Rwanda Africa

12,000 ac “Design-Build” - Krasnodar Russia
10,000 Ha (25,000 ac) Senegal Africa Irrigation Project
47000 Hectare (115000 ac) Sudan Africa Project
30,000 acre Pivot Project - Sudan Africa
25000 Hectare (61000 ac) project in Russia
32000 HA (78,000 ac) Sugar Cane Project Brazil
13000 HA (32,000 ac) Project in Ethiopia
120,000 acre (50,000 HA) project in Egypt (> 500 wells)

- IRZ Hydrogeology and Well Design Service

Over 600 m³/hr (>2500 gpm)
USA IS LEADER IN IRRIGATION TECHNOLOGIES
WE MUST INVEST IN WATER INFRASTRUCTURE
ALL WATER CONFLICTS CAN BE SOLVED
WE MUST CONTINUE TO FEED THE WORLD
SUSTAINABLE IRRIGATION WILL BENEFIT THE ENVIRONMENT

Thanks
Fred Ziari
fred@irz.com
Cell: 541-571-1111