

# AGRIBUSINESS OPERATIONS

## INCREASING AGRIBUSINESS ROI THROUGH CUSTOMIZED IRRIGATION SOLUTIONS

HIGHER YIELDS... LOWER COSTS...  
PRECISION APPLICATION



 **LINDSAY**™

# How irrigation improves ROI

Center pivot irrigation systems are the leading method of crop irrigation in many agricultural zones across the United States. First commercially introduced in the 1950s, center pivot systems are steadily replacing traditional flood irrigation and other types of sprinklers.

A great number of irrigation conversions are being made to offset farm labor shortages but, as an added benefit, center pivots are also highly efficient with up to 95% efficiency in terms of application uniformity.

California State University's Center for Irrigation Technology

maintains that center pivots adapt most easily to the greatest number of conditions, such as soil type and topography.<sup>1</sup>

With irrigation, there is no need to wait for moisture to begin the growing season – also known as a “planting rain.” When day-length and temperatures are right, irrigation can supply the necessary moisture to start planting.

In dry years, irrigation effectively expands the growing season, allowing more flexibility and choices for growers. Longer-season, higher-yielding hybrids may be selected to take full advantage of the whole growing season.

In addition, with double cropping systems, the first crop can be removed earlier allowing for additional flexibility in timing and selection of the second crop. As a result, growers have more options available to them.

Mechanical move irrigation has been at the leading edge of farming technology. This makes it a better management tool for increasing efficiency, so growers can stay competitive.

## Main benefits of irrigation

- **The ability to hedge against the weather**
  - Dry years
  - Spotty or sporadic moisture patterns
  - Lack of early moisture
- **Reduced risk of crop failure**
- **Lower cost of production**
  - Reduced labor and fertilizer costs
  - Better nutrient management
  - Timely fertilizer application
- **Higher yields**
- **Increased water usage efficiency**
  - Even water application across rows
  - Precise timing and measurement of water application
  - Minimized water loss due to evaporation and run-off
  - Eliminates idle land
- **Multiple crop versatility**
- **Higher returns**



From a wide range of tower structure heights to customized sprinkler packages, Lindsay irrigation systems are designed for optimum efficiency.

<sup>1</sup> <http://www1.eere.energy.gov/inventions/pdfs/nwpreag.pdf>

## YIELD OF VARIOUS CROPS WITH AND WITHOUT IRRIGATION

Crop	Irrigated Yield	Non-Irrigated Yield	Source
Alfalfa <sup>1</sup>	4.0 tons/A (1.6 tons/ha)	2.7 tons/A (1.1 tons/ha)	U.S. Dept. of Commerce
Grain Sorghum <sup>1</sup>	89.7 bu/A (36.3 bu/ha)	36.5 bu/A (14.8 bu/ha)	High Plains of Texas
Wheat <sup>1</sup>	39.8 bu/A (16.1 bu/ha)	16.8 bu/A (6.8 bu/ha)	High Plains of Texas
Potatoes <sup>2</sup>	294.7 cwt/A (119.4 cwt/ha)	196.5 cwt/A (79.6 cwt/ha)	Manitoba, Canada
Sugar Cane <sup>3</sup>	36.9 tons/A (14.9 tons/ha)	25.0 tons/A (10.1 tons/ha)	USDA
Corn (for grain) <sup>4</sup>	180.0 bu/A (72.8 bu/ha)	144.3 bu/A (58.3 bu/ha)	USDA

Sources: 1 Irrigation of Agricultural Crops, ASA Monograph No. 30, 1990  
 2 Prairie Farm Rehabilitation Administration Paper, Report on "The Potential for Irrigation Expansion in Western Canada"  
 3 USDA – National Agricultural Statistics Services, 2002 Census of Agriculture. Volume 1, Chapter 1: Florida State Level Data (Table 33)  
 4 2007 USDA Census of Agriculture (US wide)



Center pivot and lateral move systems increase yields for a wide variety of crops and conditions.

# Key elements to consider for your operation

As an agribusiness professional, you have a complex operation with unique needs that require balancing profitability, environmental regulations, expansion and competition.

A reliable, customized irrigation system will not only control the uncertainty of weather, it will help you overcome challenges, and enhance the return on investment while simplifying and adding value to your operation.

## ROI

- Long system life
- Resale value
- Improved yields

## SIMPLICITY

- Ease of installation and use

## CUSTOMIZATION

- System design to fit your field
- System customized to meet your specific needs
- Chemigation/fertigation

## TECHNOLOGY

- Time, energy, labor and water savings with advanced monitoring system
- Complete, accurate recordkeeping

## COST SAVINGS

- Energy, time, labor and water usage
- Less downtime due to reliability and lower maintenance
- Capital
- Reduced long-term maintenance costs

## PRODUCTION EFFICIENCIES

- Water usage
- Input costs
- Timing of irrigation
- Earlier crop harvest

## QUALITY

- Durability
- Manufacturing/design process developing innovative, reliable products

## RISK AVERSION

- Long-range planning
- Monitoring and control capabilities

## SUPPORT

- Dealer network/relationship at all levels of the organization
- Superior service

## PRODUCTS/PARTS

- Wide range of products
- Certified technicians

## FINANCING OPTIONS

- Multiple lenders for more choice
- Customizable to fit your needs
- Additional options for foreign projects

## ENVIRONMENTAL

- Local/state/provincial compliance
- Federal government programs compliance
- Federal conservation programs and available funds
- Eco-friendly practices
- Recyclable metal
- Easier application of chemicals
- Less runoff for reduced contamination of streams/creeks/groundwater

MORE VALUE  
OUT OF  
LESS WATER



# Why pivots/laterals?

## Pivot/lateral irrigation systems – right amount, right time, right place

Applying the correct amount of water at the right time is crucial to getting a good yield, but it's also important to apply it uniformly. Surface irrigation systems fall short in this area, but pivot systems apply water evenly throughout the field at precisely the right amount.



## References

<sup>1</sup> Freddie Lamm, Daniel O'Brien, Danny Rodgers, Troy Dumler, *Sensitivity of Center Pivot Sprinkler and SDI Economic Comparisons* American Society of Agricultural Engineers (ASAE) Meeting Paper #MC02-201, 4/2002.

<sup>2</sup> *Economics of Irrigation Systems* – B-6113, Texas Cooperative Extension, Texas A&M University, 12/2001.

## Pivots/laterals v. flood irrigation

### Less waste

The most obvious benefit to irrigating with a pivot or lateral system is that it produces less waste. You get even, precise water application across the rows (Figure A), rather than having too much water at the upper end, and not enough water at the other end of the field (Figure B). You won't lose water to evaporation, and you can control the timing and amount of water that is applied. There's also less runoff, helping prevent contamination of the water table and nearby streams.



Figure A  
Pivot/lateral irrigation

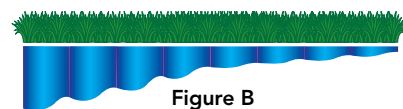


Figure B  
Flood irrigation

### Lower labor costs

The Zimmatic irrigation system by Lindsay is automated, so no one has to move pipes, or open and close floodgates. There are no ditches to maintain for pivots. One technician can operate as many as 25 pivots. Plus, remote control and monitoring options are available.

### Higher return on investment

The long life of a pivot or lateral system will save you money year after year. You'll use less water, reducing your energy costs. A Zimmatic pivot or lateral system also applies chemicals and fertilizers evenly, accurately and inexpensively. All this adds up to consistently higher yields.

## Pivots/laterals v. drip

### Better return on investment

A pivot or lateral system costs less per acre (hectare) to install. For example, a Subsurface Drip Irrigation (SDI) system costs over 200% more than a pivot system to install on 125 acres (50 hectares).<sup>1</sup> On larger fields, the cost difference is even greater. The irrigation efficiency is similar with use of drops and LEPA nozzles (95% v. 97%).<sup>2</sup> And if you ever want to sell, there's a higher resale value on a pivot/lateral system, too.

### Fewer maintenance hassles and labor costs

Compared to an SDI system, maintenance is extremely simple for pivot and lateral systems. There is no emitter clogging, and no filter maintenance – it requires only a screened intake. Rodents, roots and cultivation equipment won't damage your system. Even algae and chemicals aren't issues.

### More benefits for you and your environment

You can monitor and control your pivot/lateral irrigation system remotely. You can quickly apply water after seeding and as often as needed after that. It's also easier on your field. When you want to remove your equipment, you won't have to remove and replace damaged or deteriorated SDI tape. Not to mention the fact that pivot systems are nearly 95% recyclable.



# Customized solutions to increase profits

A large-scale irrigation project requires specific planning and preparation. Lindsay offers a custom turnkey solution based on your crop type(s), needs and budget – even in areas with limited infrastructure.

You may currently be working with a crop consultant, or may have used a consultant's services in the past. No doubt you've probably done some research

on your own as well. Together with those information sources, your dealer can provide localized recommendations.

Whether you want to upgrade an old system or install a new system with the latest technology, we can help you design a durable system that maximizes efficiency. Your dealer will explore every facet of your operation to add value and reduce risk.

In addition to customizing a system for your specific needs, we can provide:

- On-site or seasonal training
- Long-term mutual purchase opportunities
- On-site parts inventory
- Winter or spring maintenance programs



Systems and sprinklers are designed to meet your specific field and local climactic conditions.



Trained dealers provide annual checkups, seasonal maintenance and service when necessary.



User-friendly controls are customizable for your operation.



### Crop rotation plan

- 5-year plan
- Herbicide carryover for recordkeeping
- Residue (high residue crops after low residue crops to prevent topsoil erosion)
- Timing

### Soil & topography

- Characteristics (depth of soil, texture, infiltration rate)
- Relief (slope)
- Drainage
- Runoff

### Water availability & supply

- Ground water
- Surface water
- Agricultural wastewater
- Industrial wastewater
- Municipal wastewater
- Adequate flow during peak demand months

### Crop water requirements

- Crop-specific water needs
- Local soils and climate
- Crop evapotranspiration
- Tillage practices

### Irrigation system design

- SmartDesign custom system design
- Custom sprinkler packages
- Water uniformity
- Scheduling and automation
- Fertigation
- Chemigation

### Pumping requirements

- Design expertise
- Custom pump station systems
- Testing prior to shipment

### Control system options

- Remote monitoring
- Remote control
- Computer panels
- Alerts

### Government requirements

- Recordkeeping
- Local regulations
- Water usage
- Reduced contamination

### Economic & ROI analysis

- Investment costs
- Annual maintenance costs and savings
- Enhanced crop revenues
- Return on investment analysis

### Training & after-sales service

- Winterization
- Spring startup
- Preventive maintenance programs
- Spare parts

# Lindsay – A proven solution provider

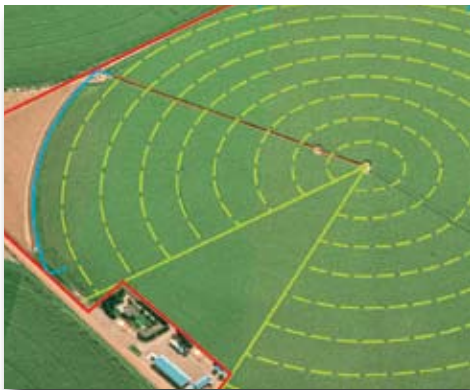
Tough, dependable Lindsay irrigation systems have been the choice of the world's irrigators for more than 30 years. Unlike many other long-term equipment investments, Lindsay irrigation systems pay for themselves many times over their lifespan.

Lindsay's trained irrigation professionals offer support beyond products and technology. They help you utilize best management practices that lower operating costs through efficient use of inputs.

From corner irrigation systems to anti-theft products, we offer the highest-quality, highest-

performing equipment. Lindsay offers a complete line of pivots and laterals, along with a variety of control system options.

Year after year, these systems prove themselves in varying types of terrain, crop situations and irrigation requirements.



## SmartDesign

This program allows the dealer to design and review with you an irrigation system that fits your specific field to optimize acreage utilized for increased ROI. Determine field boundaries, obstacles, system length, and total irrigated acres to increase application accuracy and efficiency.



## FieldNET™

FieldNET builds a network between pivots, providing full control and monitoring capabilities. It's the industry's first completely Web-based, real-time irrigation management system that provides a view of every pivot, including location, status and water usage. It offers convenience as well as labor and energy savings.



## Control panels

Depending on your needs, each user-friendly GrowSmart™ control panel offers a different level of control, convenience and maintenance options.

### Pivots and laterals

Durable parts, quality components and a wide range of tower structure heights provide crop clearance and stable operation on varying terrain. Mobile systems allow growers to spread out their investment over multiple fields and corner systems bring more acres under irrigation. For tough tracking problems, Z-TRAX eliminates ruts and pivot shutdowns.



### Poly-lined pipe

Top-of-the-line alternative pipeline offers excellent wastewater management solutions. Heavy-duty High Density Polyethylene (H.D.P.E.) liner handles corrosive elements, saline and acidic water.



### Customized sprinkler packages

Rotating-spray, fixed-spray and LEPA sprinklers provide a variety of coverage and pressure solutions to fit your specific field/crop conditions and needs.

### Watertronics – Customized pump stations

Watertronics, a subsidiary of Lindsay, offers a complete, integrated pump station that helps you maintain consistent water delivery from river stations, irrigation reservoirs, canals and lagoons while lowering energy costs.

Each pump station is engineered and factory-tested based on your needs and field conditions to ensure peak performance.

- All components are integrated and housed in one complete unit
- Precision energy efficiency Variable Frequency Drive provides immediate energy savings
- Simple monitoring and control
- Continuous surge-free pressure regulation for enhanced efficiencies
- Horizontal and vertical pump stations available

# The Lindsay Advantage

## Research & development

One of Lindsay's primary objectives is staying at the forefront of research and development for our industry. We strive to create products and equipment that meet customer needs in conditions that are constantly evolving.

By design, Lindsay products promote and enable the conservation of precious freshwater resources and the reduced usage of energy resources in agricultural applications, which provides agribusiness professionals with increased return on investment.

## Manufacturing process/robotic technology

An aggressive capital investment program is dedicated to the routine and continuous upgrade and/or modernization of the manufacturing processes used throughout the global organization. Our state-of-the-art equipment includes computer-controlled laser and plasma fabrication, and robotic and automatic welding.

Employees are trained in the use of proven tools such as 5S, Kaizen, "Managing by Facts" (MBF), along with problem solving and corrective actions to ensure our high manufacturing standards are met. All of this results in equipment that is more cost-effective for our customers and ensures consistent quality.

## Quality

Lindsay is ISO 9001:2000 certified and committed by policy and behavior to meet or exceed customer expectations. We utilize sophisticated inspection equipment such as Coordinate Measuring Machines (CMM), eddy-current and ultrasonic tubing inspection, and Optical Comparators, and enforce extremely rigid control and re-calibration of all inspection equipment.

Quality begins at the source, which means that employees are held individually accountable for the quality of work. This dedication to excellence provides agribusiness professionals with increased reliability, less downtime and higher resale value.

## Pre-market field testing

Prior to releasing new products to production, each one goes through extensive testing in our research lab and fields. They are also tested in the field by end-users.

We rely on large agribusiness professionals to test and provide feedback on these new products prior to worldwide release.

## Factory training and support

We require annual technical service training for our dealers regarding new products, electrical systems, design and field installation, troubleshooting, controls, along with specialized products such as corners, telemetry, pump control, etc. They may also achieve certification for successfully completing new product and technology related courses.

In addition, we offer technical service courses conducted at our factories for end-users (mostly large agribusinesses) of our equipment who wish to build their own systems and perform their own maintenance and repairs.

## Service approach

We prepare our dealers to erect, diagnose and troubleshoot our pivots and laterals as well as the competitor pivots. Therefore, we offer beginning and expert level courses every year that the dealers are required to attend. We also offer shorter courses and webinars for new/technology products.

Lindsay dealers are committed to growers before, during and after the sale of any irrigation system.

From initial pre-sale planning and customization, to routine maintenance and emergency field repairs, growers can rely on their local dealer.

## Parts distribution centers

These are located in Lindsay, Nebraska; Paul, Idaho; Amarillo, Texas and Leslie, Georgia. Each center's goal is to keep critical components in key markets to reduce shipping time from the Lindsay, Nebraska warehouse. Factories around the world also stock products and parts to meet delivery needs. This reduces downtime in the event of a breakdown or storm damage.

The distribution centers specifically hire employees with service and parts backgrounds on all brands of pivots and laterals to better support our dealers.

## Customized financing

We offer growers throughout North America a risk-free source of financing and leasing on irrigation equipment. Our preferred lenders provide competitive rates and their terms are flexible.

The application process is simple and the expertise of our lenders will help growers with their individual business needs.

Lindsay works with Ex-Im Bank and can help with documentation in many parts of the world. Special financing is available through DLL in some markets.

## Lindsay

The company name is derived from its location, the town of Lindsay, Nebraska, in the center of the United States. Lindsay became a pioneer in center pivot technology, developing a system which enabled irrigation equipment to move easily up and down steep grades.



[www.lindsay.com](http://www.lindsay.com)



## An international irrigation leader

Lindsay has a worldwide dealer network with warehouses in Nebraska, Texas and Idaho; factories in the United States, Brazil, France, and South Africa; and additional sales offices in Australia, China, Egypt, Guatemala and Mexico.

We can coordinate a variety of resources to implement turnkey irrigation systems wherever they're needed, through our dealer network or Lindsay resources.

**For more information, visit [www.zimmatic.com](http://www.zimmatic.com) or talk to your Lindsay dealer.**



**USA:** 2222 N. 111th St., Omaha, NE 68164 • **Africa:** cnr Vosmaar & Drommedaris Street Dal Josafat Paarl, 7620, South Africa

**Brazil:** Rodovia Adhemar Pereira de Barros - SP 340-KM 153, 5 Jd. Bela Vista - Caixa Postal 1001 CEP 13800-970, Mogi-Mirim, Sao Paulo, Brazil

**Lindsay Europe SAS:** 72300 La Chapelle D'Aligne, France

**Lindsay Beijing Representative Office:** Room 403, Building C Beijing Lufthansa Center Number 50, Lianmaqiao Road Chaoyang District Beijing, China 100016

1-800-829-5300 • 1-402-829-6800 • [www.lindsay.com](http://www.lindsay.com)



**Lean, Clean and Green.** Lindsay Corporation is committed to developing environmental awareness and implementing sustainable practices to reduce the use of and protect energy, water, and all other resources.



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LI-LRGGRW 2009-5 2,500