
# Session 4. Securing Water for Smart Irrigation in Low Raining Climates

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SAFE CONTAINMENT
WASTE, WATER & MINING

SECURING WATER

SMART WATER TECHNOLOGIES

Challenge for More and More Countries or Territories wanting to Secure Food

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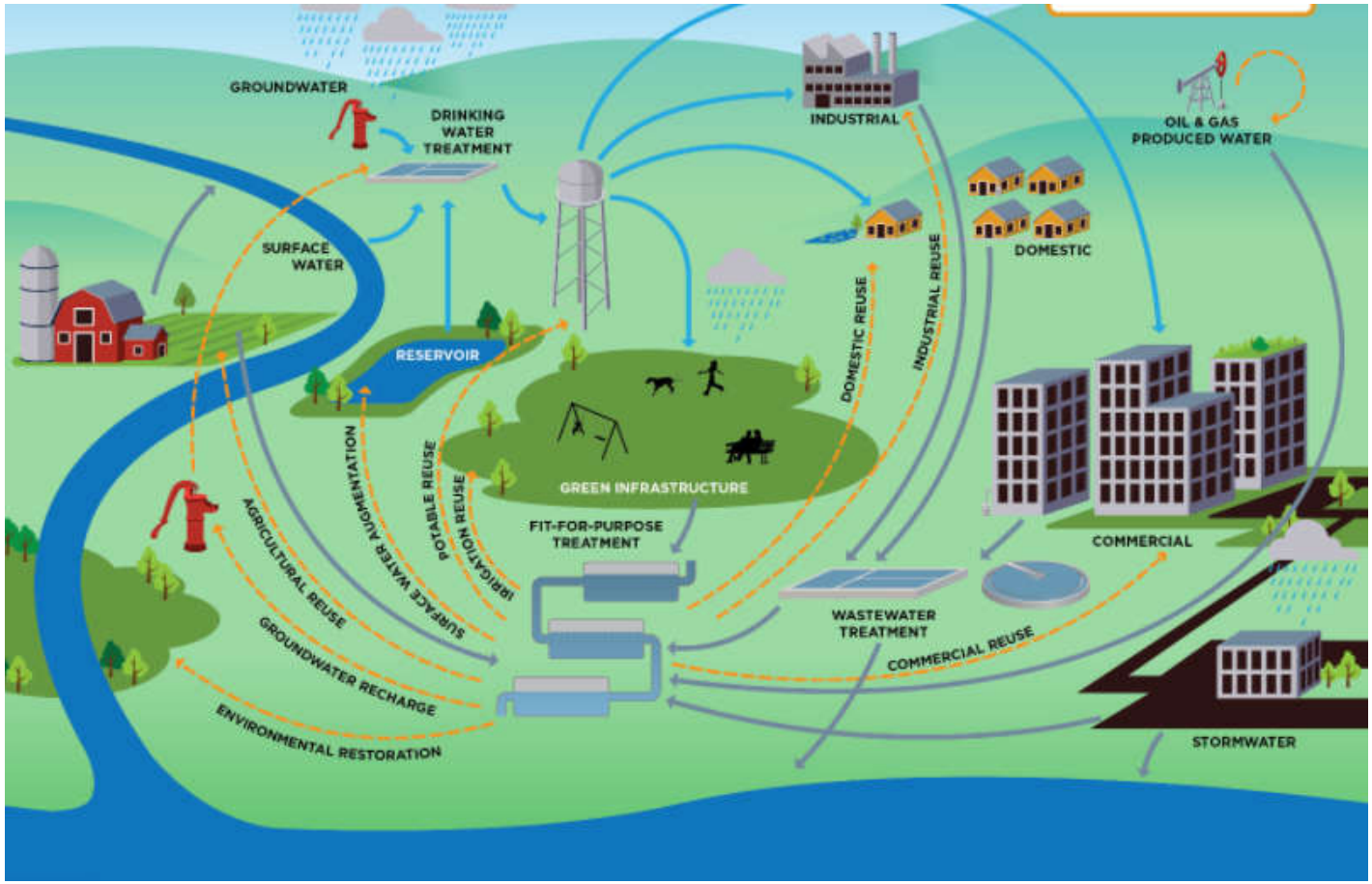
# What's the Need???

- Get Fresh Water
- Distribute the Water
- Water to be stored
- Maintain Water Quality
- Low Investment

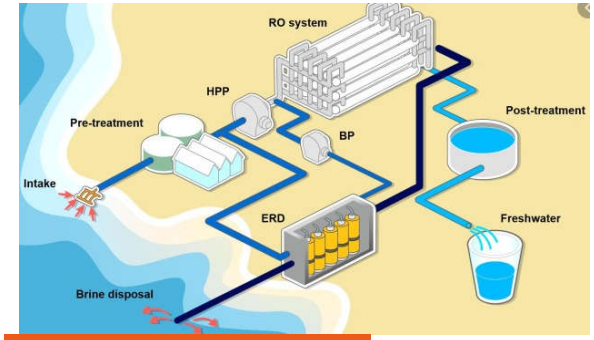
## SMART WATER TECHNOLOGIES

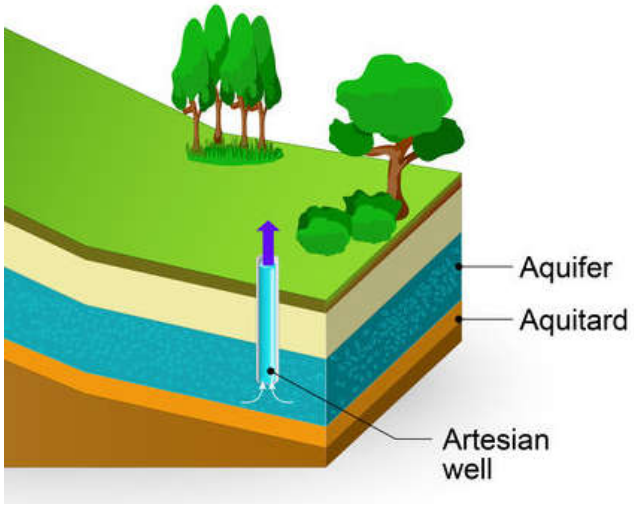



## SMART AGRICULTURE

# Water Resources???

- Precipitation – RainWater
- Surface Water - Rivers, streams.
- Ground Sources - Groundwater, Springs, Aquifers
- Desalinated seawater
- Water Reuse (Wastewater Treatment)



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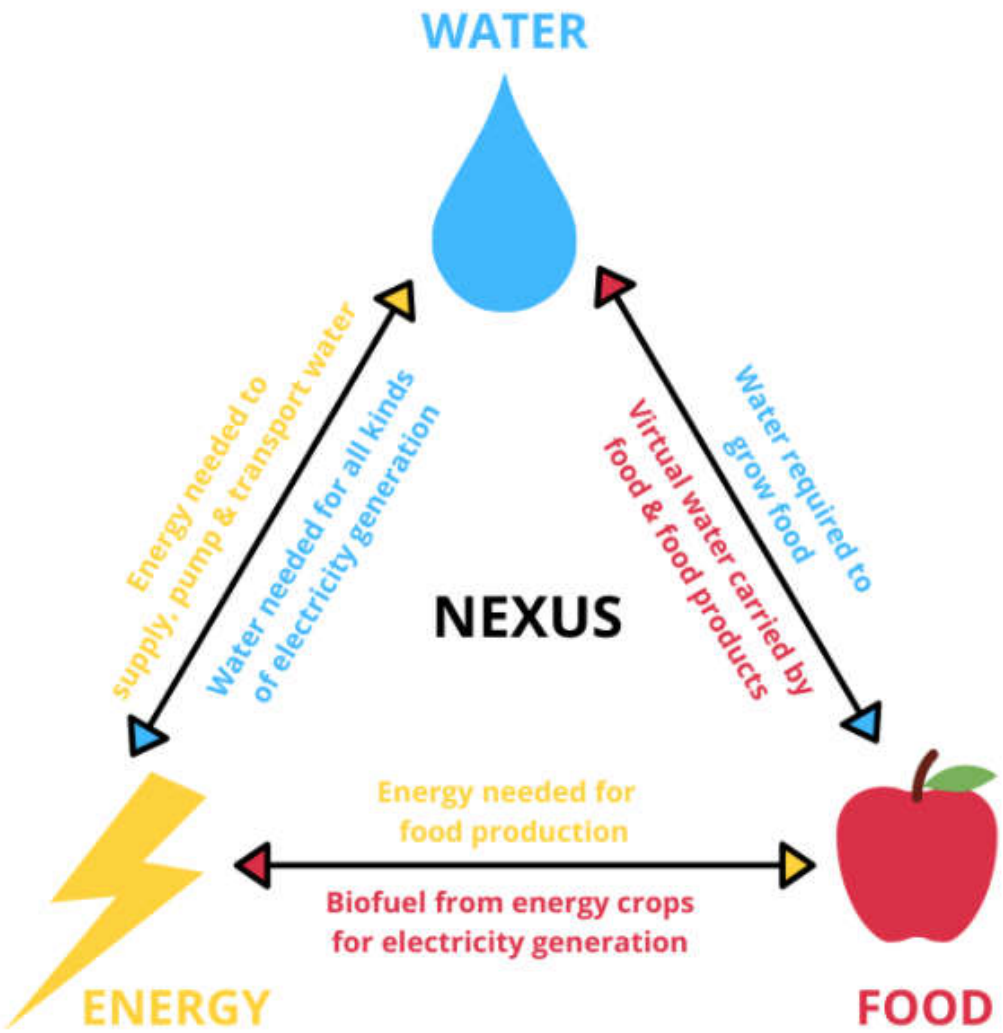
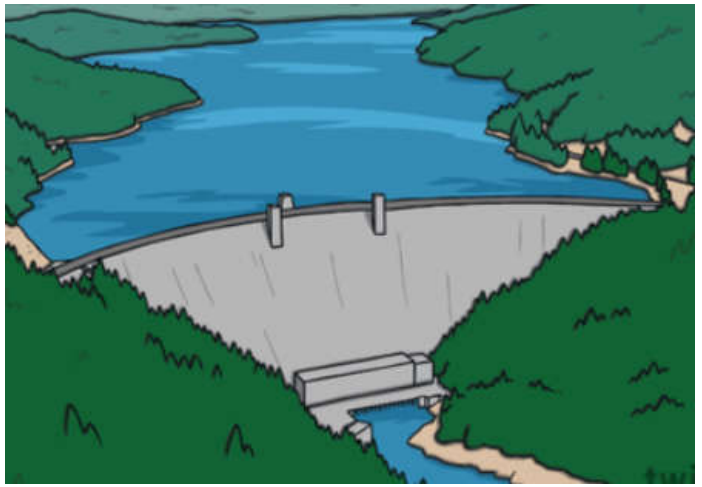


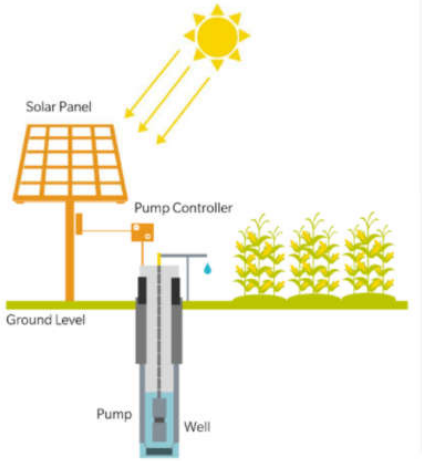

## SMART WATER TECHNOLOGIES

Main Issue - **When will I have water to irrigate?**
How Much and How to irrigate is not the main issue.

# How Can We Manage it? Store it?

- Ponds, Reservoirs
- Dams
- Channels, Distributed Systems
- Wells + Pumps
- Desalinated seawater Plants
- Wastewater Treatment Plants





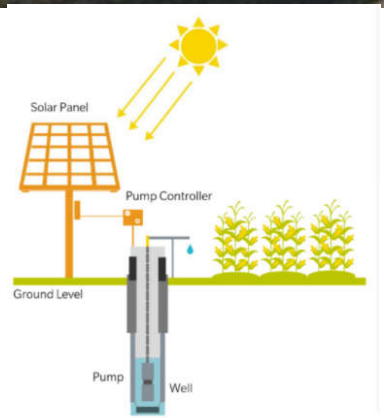

# Irrigation Ponds could be a basic pillar for Smart Irrigation

CLIMATE-SMART AGRICULTURE SOLUTION

- Functional regulation for the distribution of irrigation water;
- Regulation of channels
- Adapt the operation of the pumping groups to the type of hourly discrimination of electricity rates
- Elevation control to guarantee a minimum pressure in irrigation intakes;
- Collection of rainwater and use of runoff in drainage channels;
- Mix of resources from different sources (surface water, transfer, underground, reuse, and desalination);

# Irrigation Ponds could be a basic pillar for Smart Irrigation

- Pond/ Reservoir Save both Energy and Water costs.
- Dry climates, Water is quite Expensive; Depending on the country, Energy (i.e. pumping water) could also be expensive.
- Pond/reservoir is a low cost and competitive investment. Standalone or irrigation community investment.



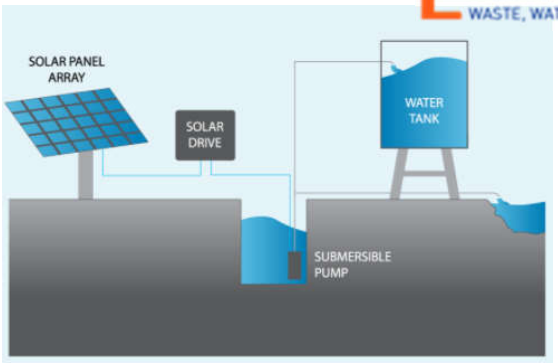

SMART TECHNOLOGY

- Low Cost & Competitive Investment
- High Efficiency
- Easy to implement

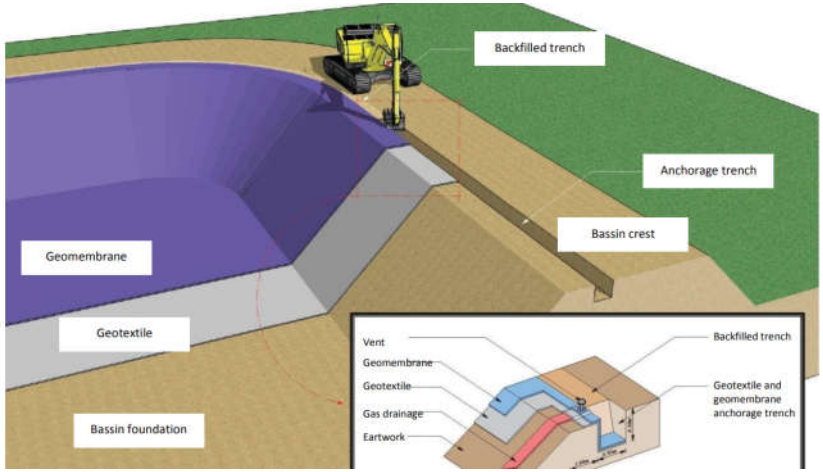
# Irrigation Pond Engineering & Construction

EarthWorks

Liners - Geomembranes




Pumps System if needed

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Available Space + Compacted Soil + Liner System + Water Pumps.


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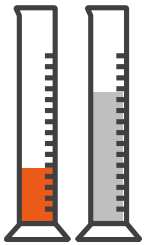
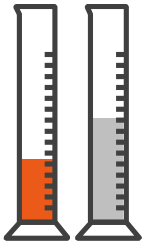
# Our Geomembranes



**HDPE**
High density polyethylene



**LLDPE**
Linear low density polyethylene

Flexibility

Chemical resistance

- **Durability and UV Solar Resistance**
- **Impermeability**
- **Competitive Solution**
- **Chemical Resistance**

Safe Containment
Waste Water Mining

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# Certificates

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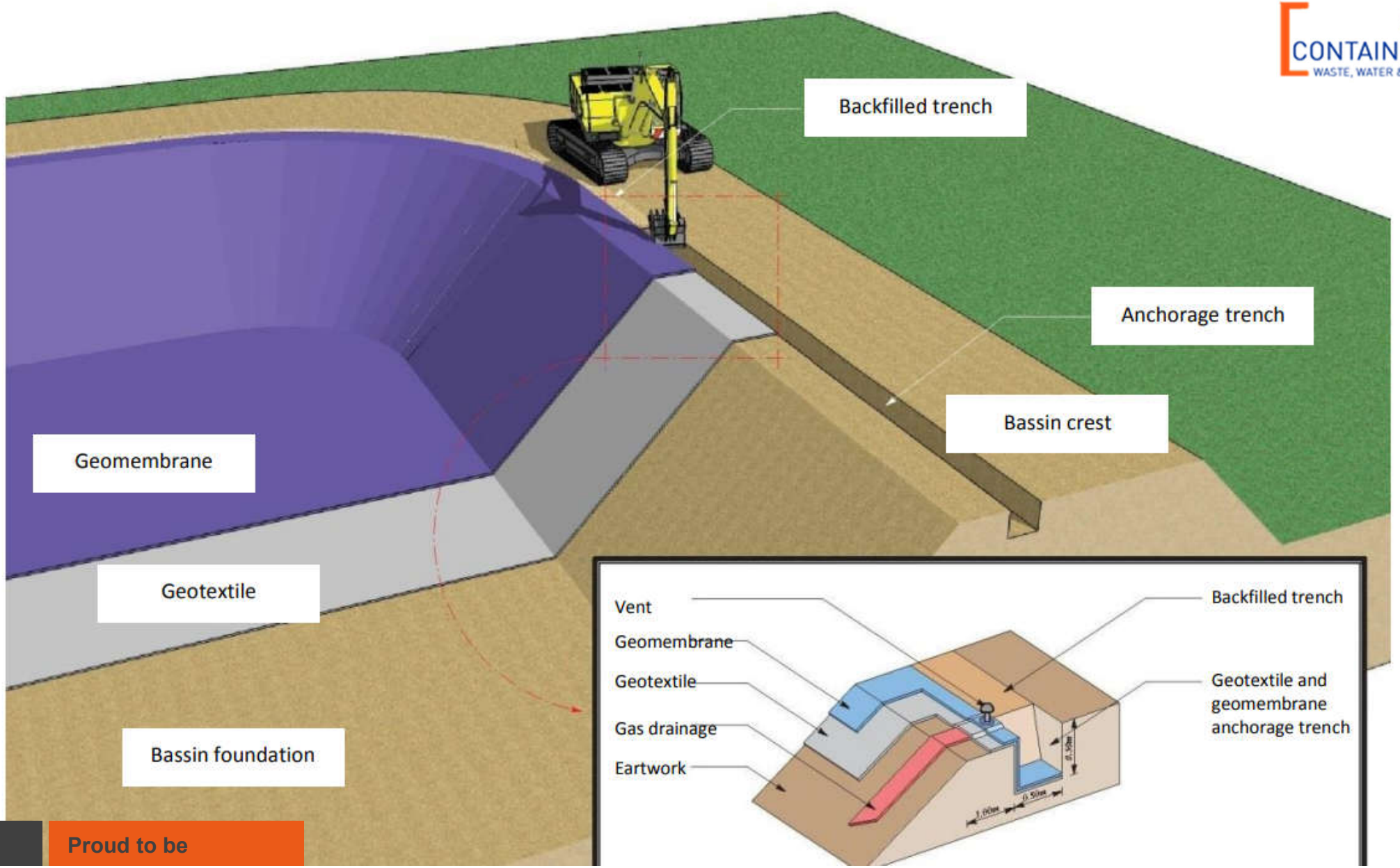

SAFE CONTAINMENT
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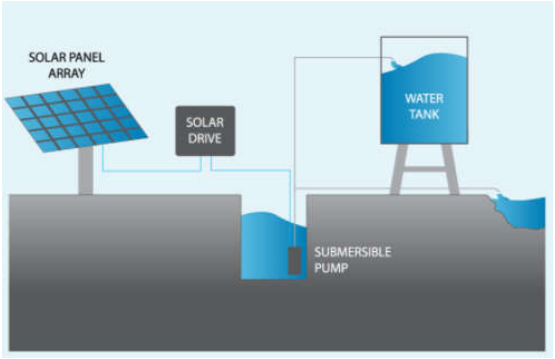
# Irrigation Pond Engineering & Construction

## Available Space + Compacted Soil + Liner System + Water Pumps + **Covers**

EarthWorks

Liners - Geomembranes

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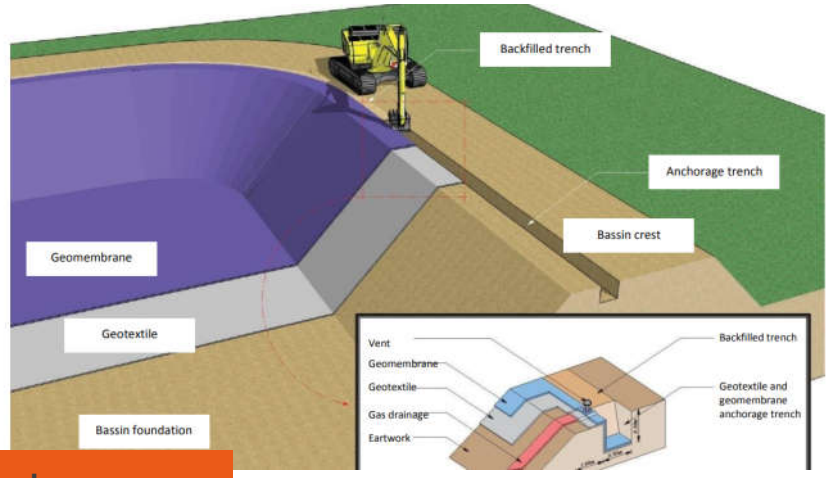


**Covers**

# Irrigation Pond Engineering & Construction – Covers – Floating Covers

SAFE CONTAINMENT
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- Evaporation control due to high temperatures.

- Reduces sunlight penetration, precluding growth of algae and clogging weeds.

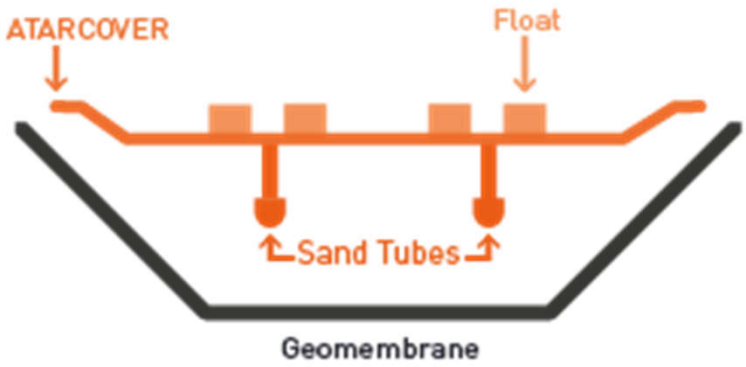
- Prevent contamination of water.
- Chlorine savings.
- Increase security.
- Reduce air pollution. Odor control.

- To transform organic waste into energy (i.e. biogas in regenerative farming).

**Easy Solution & Low Capital Costs**

# Irrigation Pond Engineering & Construction – Covers – Floating Covers

- Tensile and tear stresses dominate design wind stresses must be considered.
- Perimeter anchor design is critical.
- Short-term and long-term performance.
- Use light color GMB for temperature reduction
- Animal, accidental must be considered.




- Floating cover system design:
  - Define sumps. Slack-accommodating design. Perimeter anchor systems.
  - Cover floats and sump weights.
  - Dewatering system.
  - Hatches.
  - Operation and maintenance.
  - Safety measures.

# Irrigation Pond Engineering & Construction – Covers – Floating Covers

- Location: Murcia, South-East of Spain
- Approx. 15,000 $m^2$

# Irrigation Pond Engineering & Construction – Covers – Floating Covers

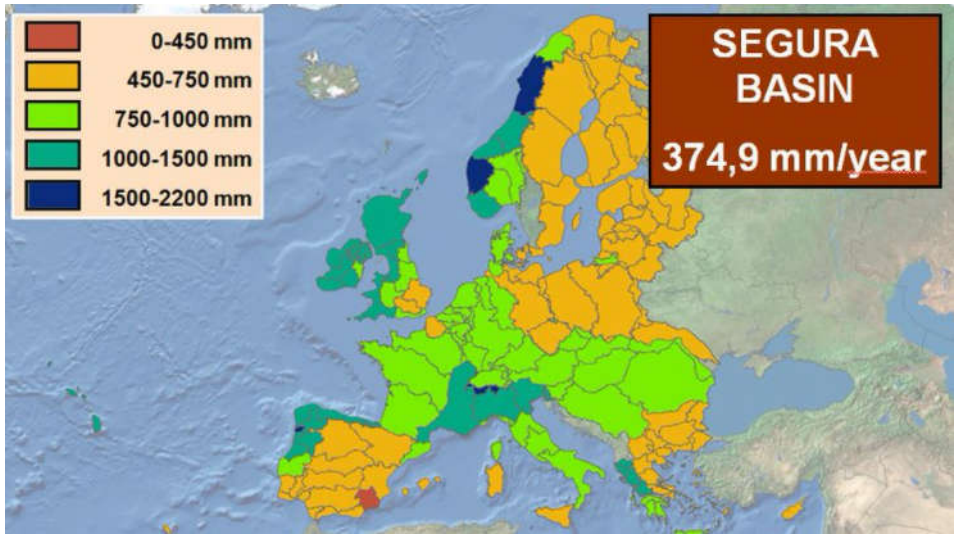
- Location: North of Morocco
- Approx. 10,000 $m^2$

- Location: Israel
- Approx. 25,000 $m^2$

# Case Study – Murcia Region, Spain – Successful Smart Agriculture

The climate can be considered as **Semi-Arid Mediterranean**

- Precipitations in general are scarce and irregular, with an average of little more than 320 mm annually;
- Temperatures are mild, around 17ºC on average and with a high level of insolation, close to 3,000 hours per year.




Spain Region of Murcia **the lowest average rainfall in Europe**

# Case Study – Murcia Region, Spain – Successful Smart Agriculture

Total area of cultivated land was 550,948 ha, of this area 187,064 ha were irrigated, which represented 34%.

Murcia has more than **14000 Irrigation Ponds**

Farmers agree that **water scarcity is one of the main problems** when it comes to irrigation management, since on many occasions the debate is not on how much and how to irrigate but **when will I have water to irrigate**

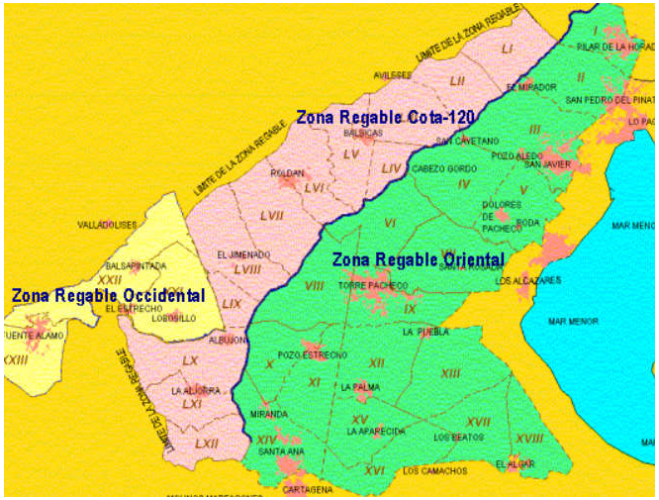
Simple and effective Solutions - Low Cost

# Case Study – Murcia Region, Spain – Successful Smart Agriculture

Murcia Region is an example of good regulatory water capacity in the three irrigation scales: River Basin Districts (Reservoirs), Irrigation Communities (Ponds) and in parcels/plots (Small Ponds)

## Smart Water Management

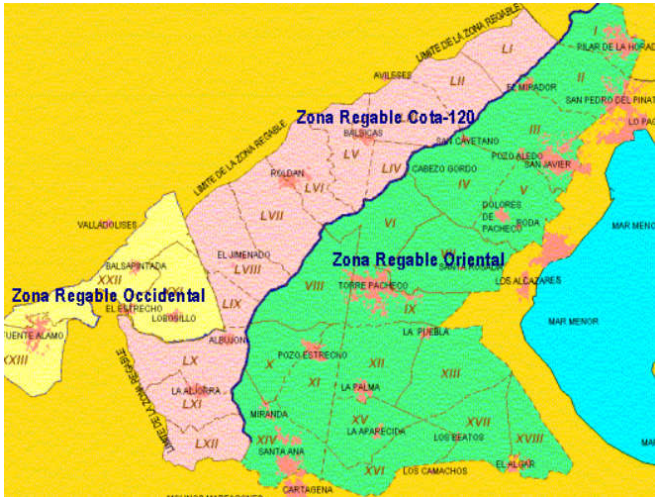

River Basin District (Reservoirs)




Irrigation Communities (Ponds)

Parcels with Small Ponds

# Case Study – Murcia Region, Spain – Successful Smart Agriculture




**Irrigation communities** can be defined “as a group of all the owners of an irrigable area” which are united by law, for the autonomous and common administration of Public Water Bodies. They are in charge of organizing all their public Water (Surface, Underground Water, ..).

- Its **main function** is the distribution of water to private parcels its irrigable area. Also it is used to:
  - The improvement  & maintenance of infrastructures. Modernization of the irrigation
  - Training and advice to the farmer
  - Installation of telecontrol systems
  - Innovation and development through research centers and universities.
  - Control Water, when to irrigate, what to plant -> Sustainable Farming

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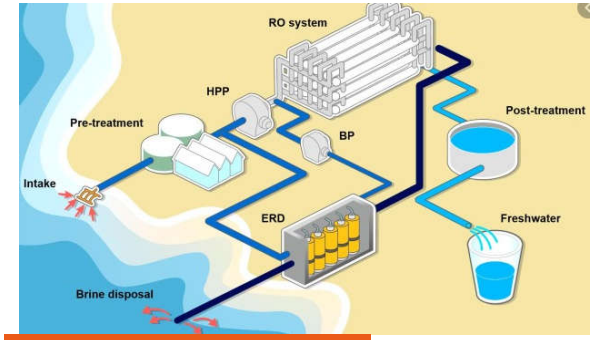
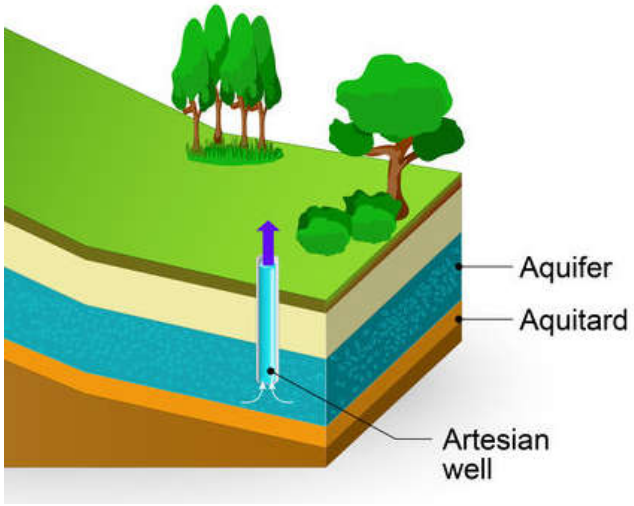
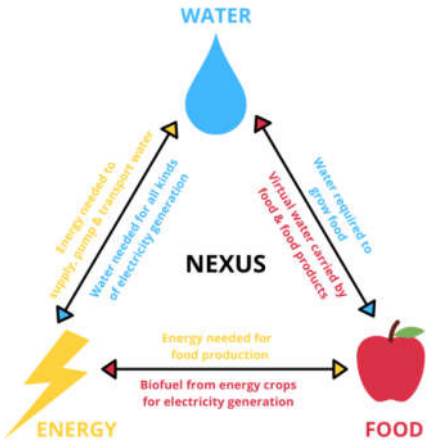


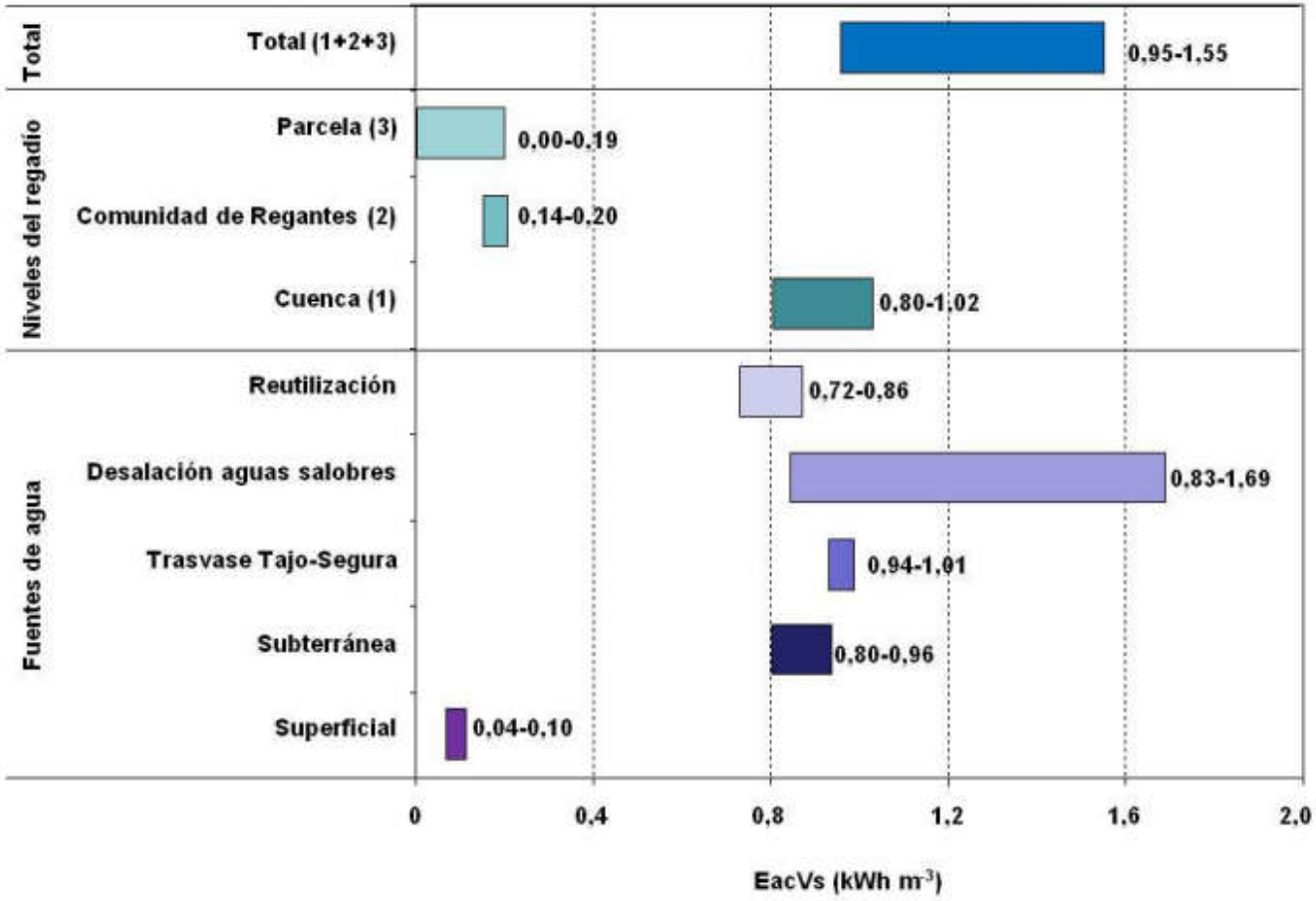



# Case Study – Murcia Region, Spain – Successful Smart Agriculture

Price of water depends on Electricity




Specific Energy Consumption (EacVs, kWh m-3) at the different Levels of Management of Water for Irrigation in 3 Irrigation Communities in the Region of Murcia



# Case Study – Murcia Region, Spain – Successful Smart Agriculture

- Months of June and July - the **demand for irrigation is greatest** because of the Warm Season, most operating hours are included in the period where the **energy is more expensive.**.
- They  have to contract also **maximum electricity power** in those months of maximum demand for the whole year.
- Irrigation communities there are periods of several months where they do not have water, this problem is aggravated normally in August with the increase in the costs of the power of electricity rates.

**Ponds & Floating Covers** to **store water** in the period When the water is available and energy is cheaper

# Case Study – Murcia Region, Spain – Successful Smart Agriculture

**Smart Water Management  with an integrated Water Management Approach**

- **Good regulatory water capacity** through River Basin, Irrigation communities Scale really important.
- The importance of **monitoring the facilities** to achieve a decrease in energy costs, given that a deviation from the optimal driving conditions can lead to increased consumption of energy.
- **Ponds and infrastructure** to manage this Water bodies
- Proper **maintenance** is needed.
- The **energy cost** is really important to manage, it will depend on many factors (the type of rate contracted, the design, the management and condition of the infrastructures for water distribution).
- **Crops** that were discontinued with this new implementation **are possible once again** or crops that prior it could not be produced
- **Harvested-water production** systems do have an important role to play in allowing farming communities to protect their lives and livelihoods and thus **build resilience in the face of climate change**.

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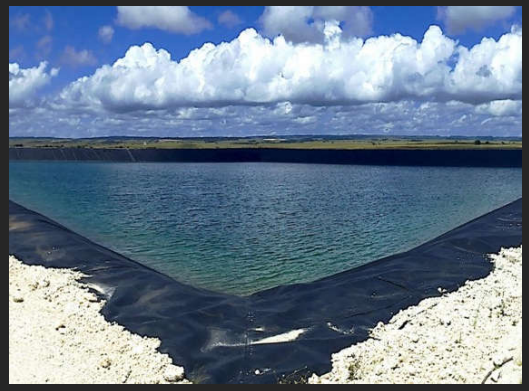
Geomembranes





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# Biodiagestor - Biogas Digester Tank Covers

- System capable of **breaking down biodegradable material** of various types to **generate biogas**, a renewable fuel that can **produce electricity and heat**.

- The use of **geomembrane cover**s is becoming the **most common form for projects** involving anaerobic digesters, **producing** significant amounts of **biogas** largely containing methane gas and carbon dioxide.

Mexico / Vietnam / Australia

**Warm Countries** are increasing the use of this Technology because of **High Temp**

**Easy Solution & Low Capital Costs to Get Energy**


Agricultural Ponds | Farm Ponds | Canals | Aquaculture | Evaporation Ponds | Water Tanks | Water Reservoirs


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