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# SOME TECHNICAL CONSIDERATIONS WHEN PLANNING FOR SPIS

Energypedia webinar Dec 15<sup>th</sup> 2021

Solar Powered Irrigation Systems  
for Small-scale Farmers in  
Mozambique - Status and  
Opportunity for the Sector

Marion Cuisin - PRACTICA

**A SPIS SYSTEM?**

# WHAT IS IT?

- **SPIS** = Solar Powered Irrigation System
- **What for?** To bring the water from a water source to the plant, thanks to solar power

→ A set of technologies working together as parts of an interconnecting network, to bring water from a water source to plants, thanks to solar power.

# WHAT IS NEEDED?

- A water source
- A pump
- A (solar) generator (= solar panels)
- A conveyance system
- An application system (manual application is also an application system, e.g. watering cans)

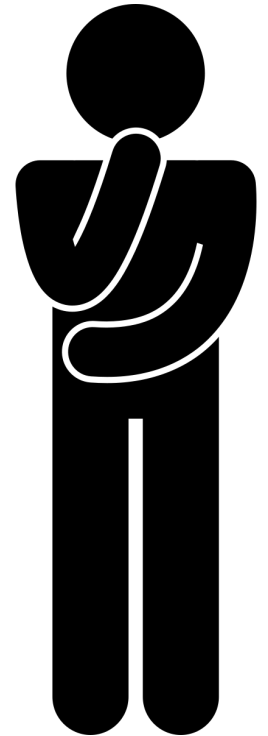
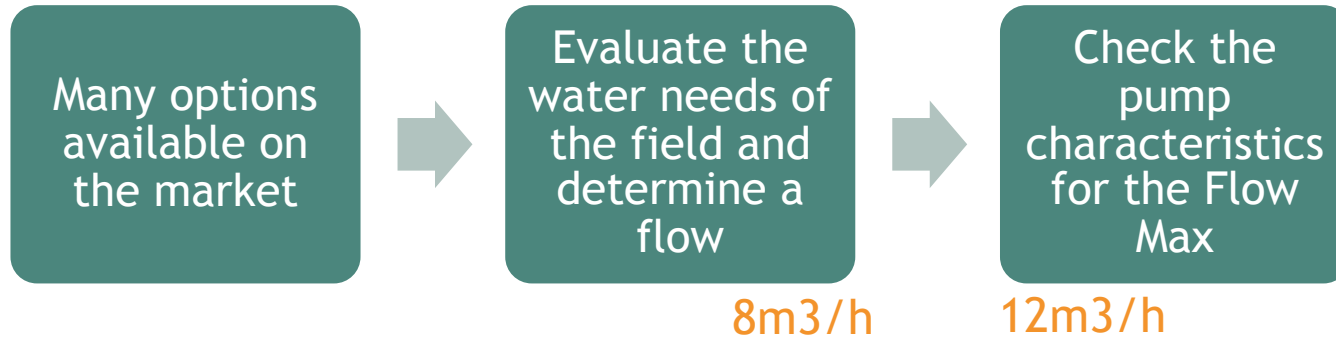
There is no “one-fits-all” system.

# How to select “the right” technology?

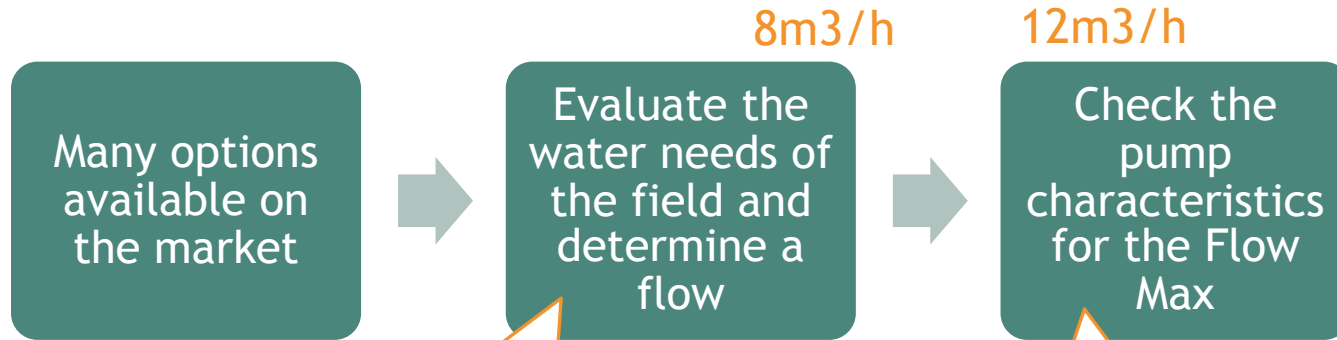
(From a technical perspective)

# WHERE (NOT) TO START?

A common mistake is to start with the **pump**:



# WHY IS IT A MISTAKE?



What if the water available is less than the water need?

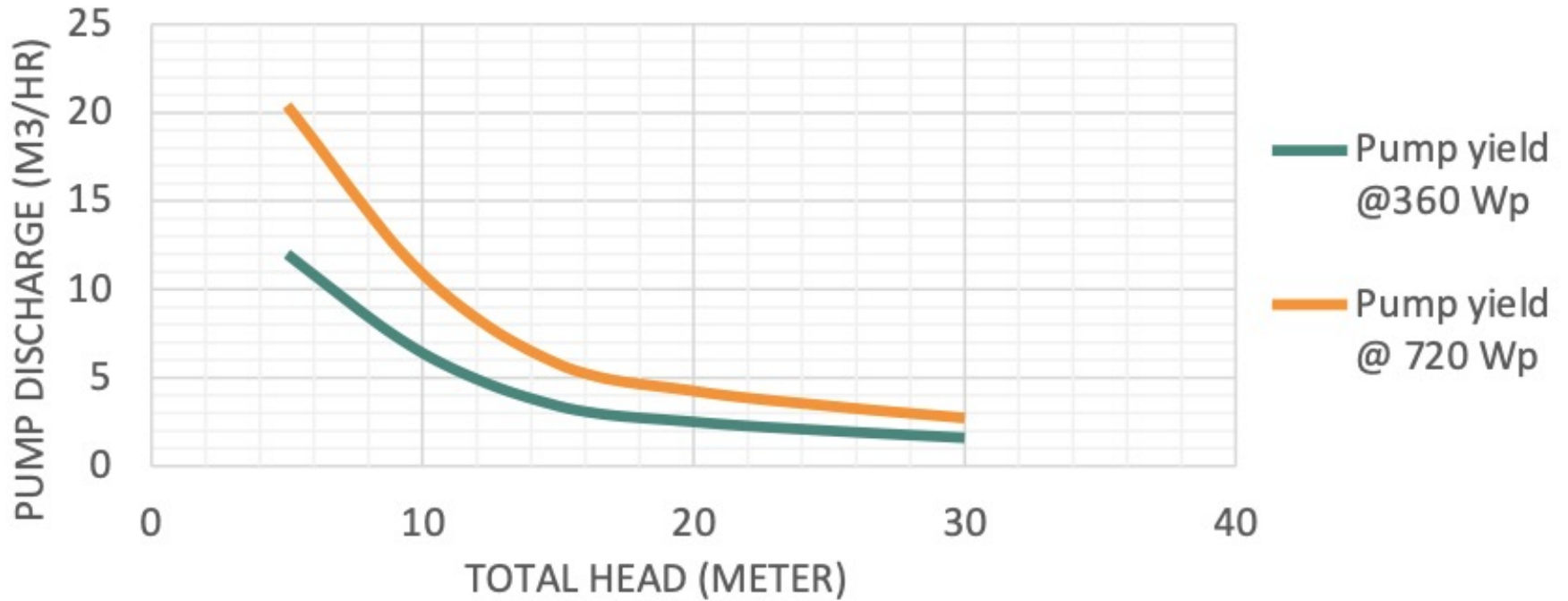
Oversizing

The flow of a pump varies depending on the water depth, application system and conveyance.

Undersizing



Pump curve





# START BY COLLECTING INFO ON WHAT YOU HAVE

Always start at the source!



## Water source

- Volume / flow available at the most critical period
- Source type
- Water level
- Water quality

## Field

- Water needed by the crop (→ to calculate the volume needed per day and make sure it is < to the availability at the water source)
- Elevation (between the water source and the field (highest point))

## Application

- Efficiency of the application system (→ to calculate the required pump flow)
- Pressure needed

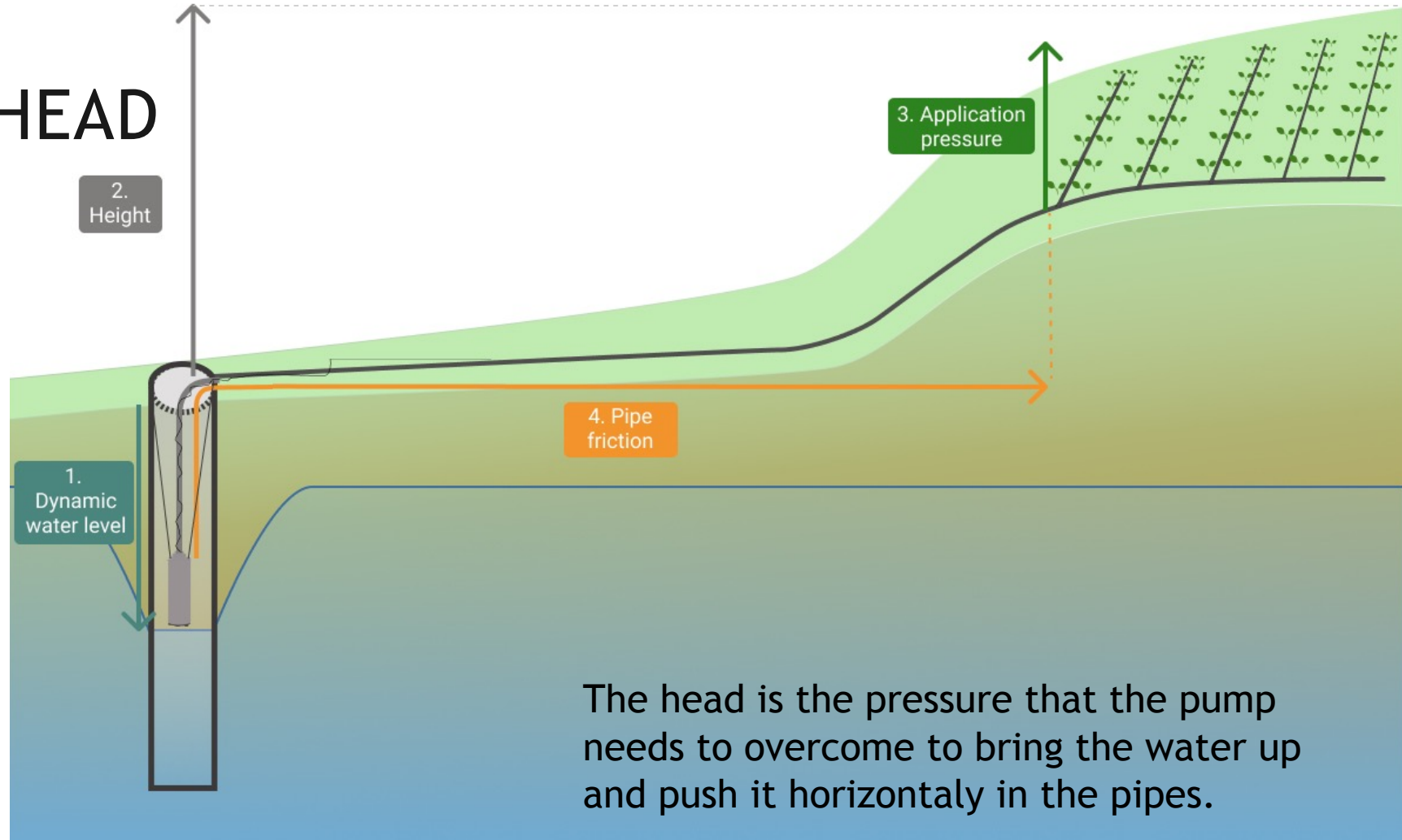
## Conveyance

- Length & internal diameter of the pipe (→ to calculate friction losses)

Required pump flow

Head

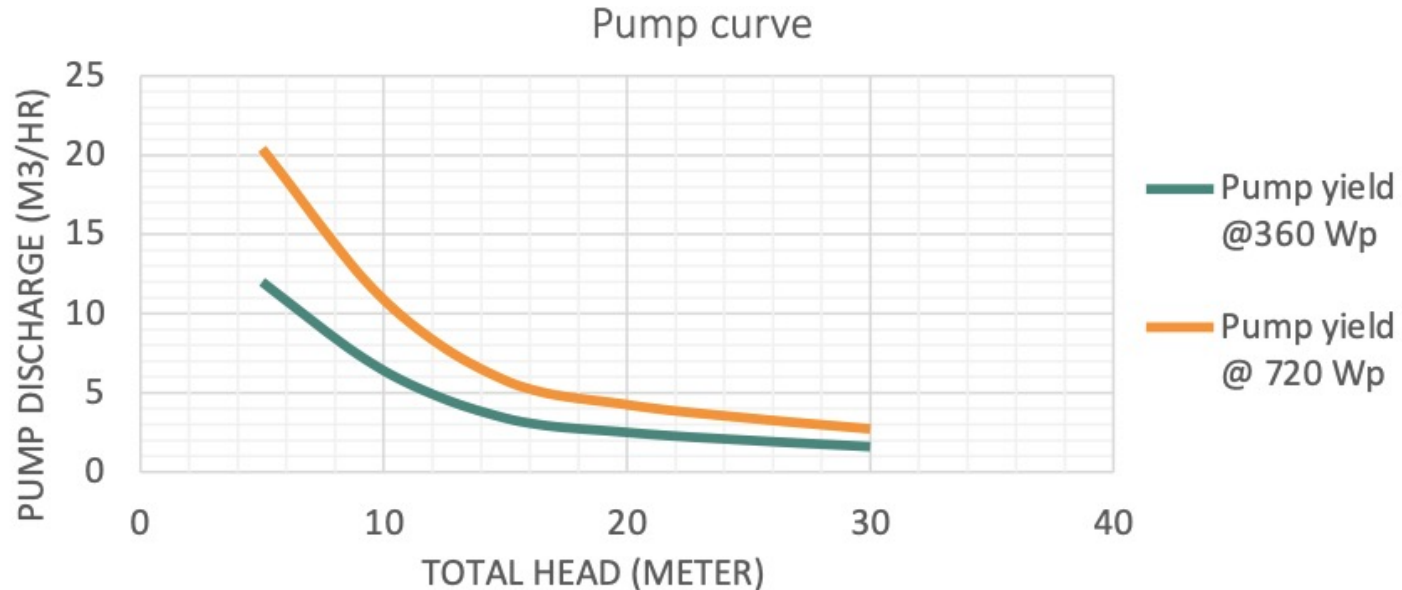
# HEAD

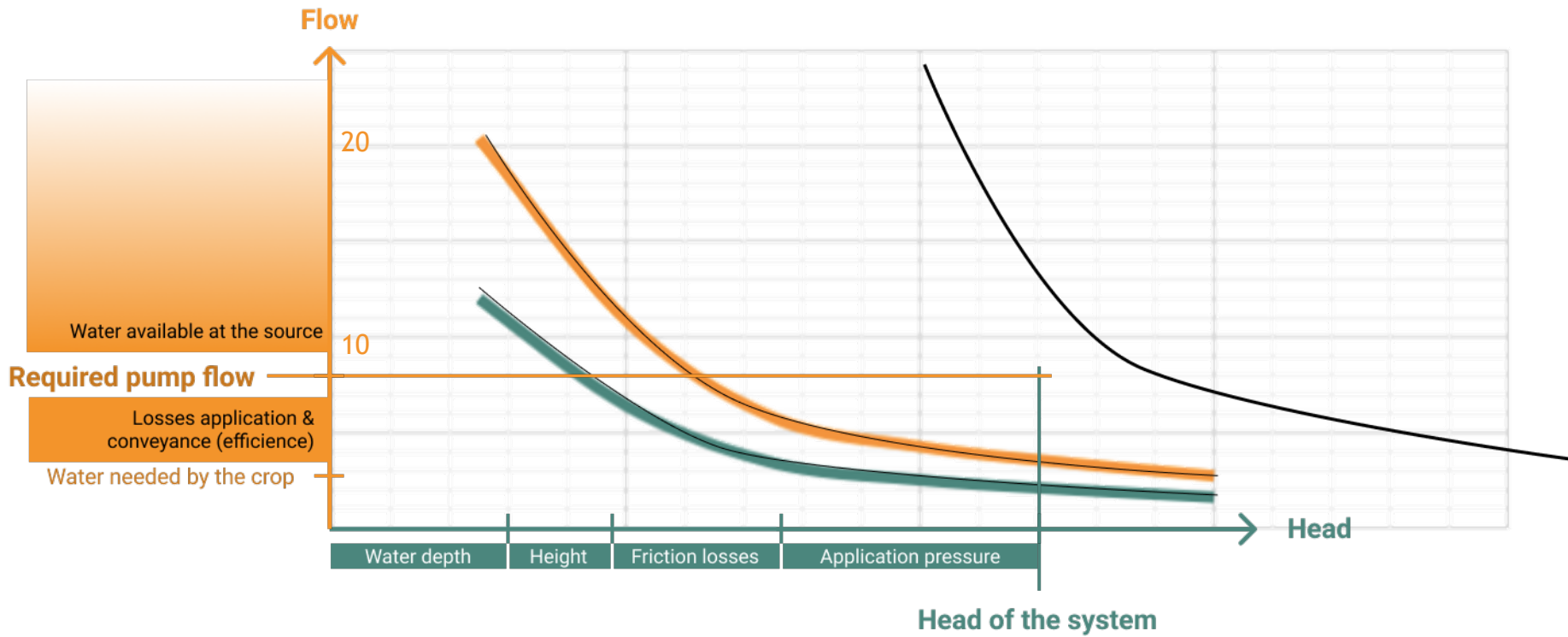


The head is the pressure that the pump needs to overcome to bring the water up and push it horizontally in the pipes.

# FLOW & HEAD

- To select the pump you need to know:
  - The required pump flow in  $\text{m}^3/\text{h}$  (= discharge)
  - The head of your system in  $\text{m}$





But that's not all

# OTHER (NON-NEGLECTABLE) ASPECTS

## Technical / practical

- Suction VS lifting pumps
- Number of solar panels
- Type of water source
- Resistivity to silt and sand
- Repairability & maintenance

## Commercial

- Technologies & services available locally
- Warranty

## Financial

- Solar irrigation technologies are expensive

## Social

- Risk of theft
- Transportability

# AND NOW?

Presentations of  
the solar irrigation  
market & the tools  
available at  
Energypedia

Training &  
training tools  
available at  
Practica

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