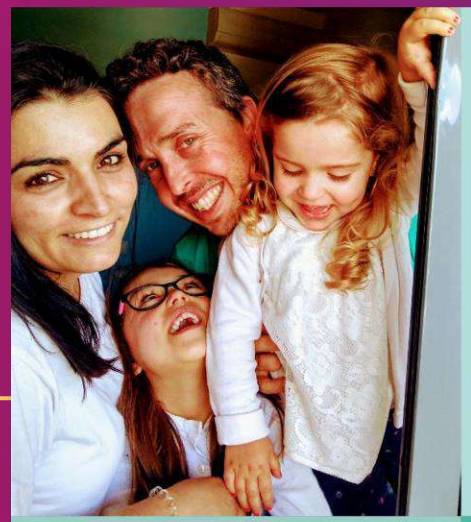
2025

Sustainable Water Use on Golf Courses: Myths, Reality and Innovation

Joel Nunes

Curriculum Vitae



JOEL NUNES, 44
Agronomic Engineer
Lagos, Algarve, PORTUGAL

Head Greenkeeper Courses

- ✓ Curia Golfe– 2004 - 2005
- ✓ Benamor Golf – 2005 - 2007
- ✓ Golfe Montado – 2007 - 2009
- ✓ Palmares – 2009 - 2024
- ✓ **Monte Rei – 2024 - Present**

"The future depends on what you do today."

Brands

Software and Apps

Daily Routine

Personality

Introvert	Extrovert
Passive	Active
Analytical	Creative
Loyal	Friendly

Associativism

i. Actual: FEGGA Chairman (Federation of European Golf Greenkeepers Association)
ii. Ex. APG President (Portuguese Greenkeepers Association President)

MY TEAM

MONTE REI
GOLF CLUB

FEGGA
FEDERATION OF EUROPEAN GOLF GREENKEEPERS ASSOCIATIONS

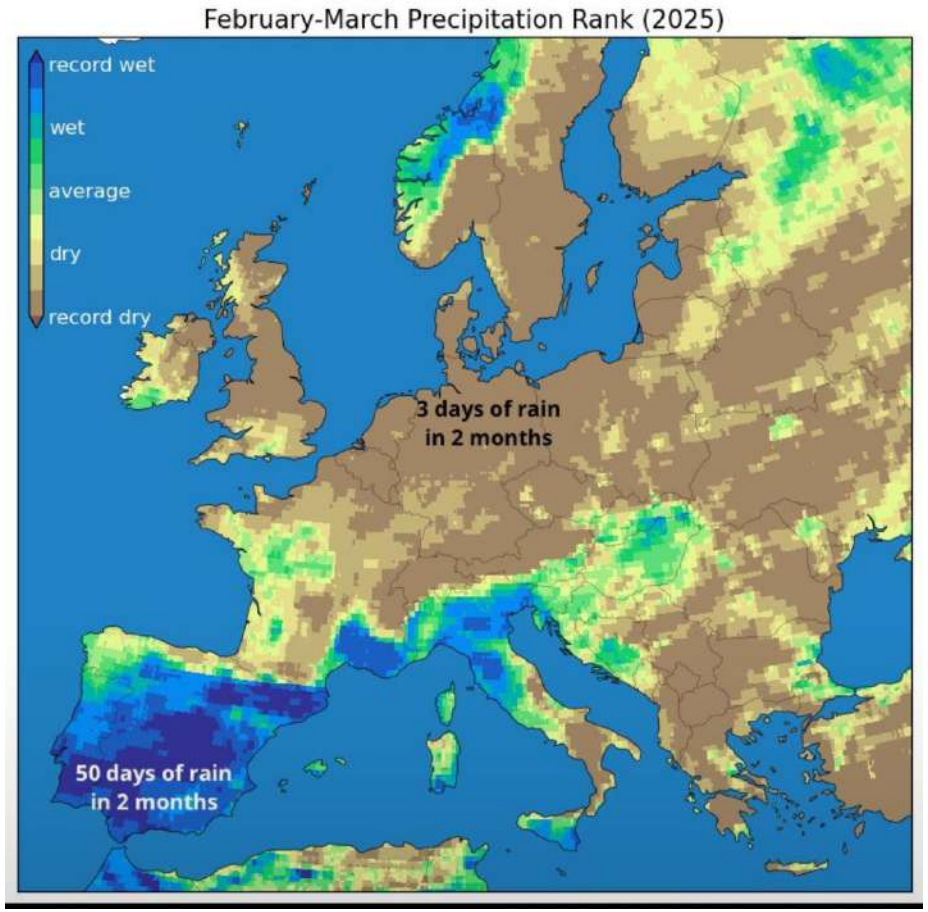
APG
ASSOCIAÇÃO PORTUGUESA DE GREENKEEPERS

UAlg
UNIVERSIDADE DO ALGARVE

WHERE IS THE CHALLENGE?

Climate change...

CURIOSITY


February-March Precipitation Rank (2025)
record wet
wet
average
dry
record dry
3 days of rain
in 2 months
50 days of rain
in 2 months

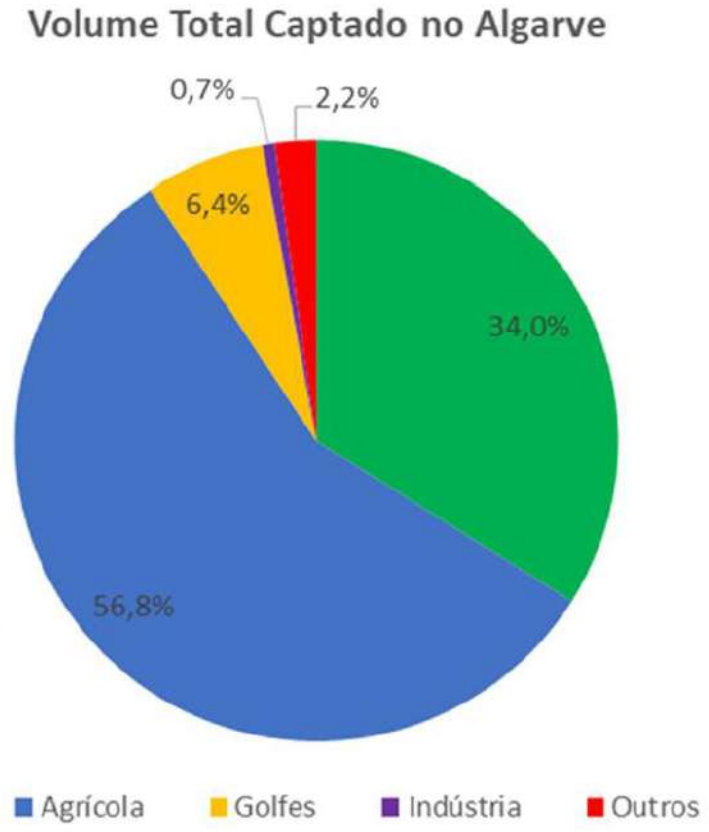

Guido Cioni · 3° e +
+ Seguir
Data Scientist | Numerical Weather Pre...
2 d · Editado ·

FRAMING

Water consumption in Algarve

- In 2019, 6.4% of the total water used in the Algarve was consumed.
- Cities in the region lose approximately 40% of treated water.
- If these losses were reduced by 50%, it would be enough to irrigate all golf courses.

Setor	Volume captado (hm3)
Urbano	80,3
Agrícola	134,3
Golfes	15,2
Indústria	1,6
Outros	5,3
Total	**236,59**



SOURCE: Bases of the Algarve Water Efficiency Plan – Volume I (APA 2020)

FRAMING

When we know the real numbers...

Greenkeepers Survey Jan/2022

Characterization and Evolution of Golf Course Irrigation in the Algarve

APG / UALG

2016-2021

Caracterização e evolução da Rega dos Campos de Golfe no Algarve 2016-2021

Joel Nunes; Carlos Guerrero
Janeiro 2022

Palavras-chaves: Golfe, Rega, Algarve, Relvado desportivo, Greenkeeping

i. Resumo

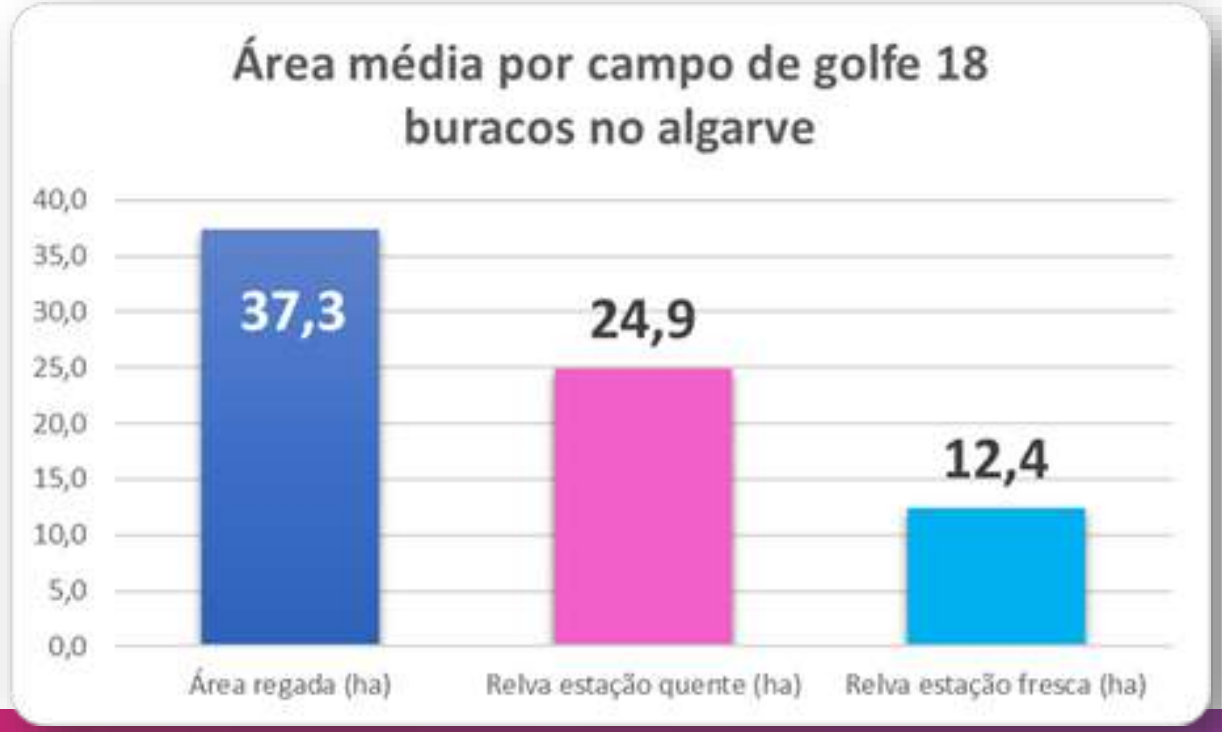
Os campos de golfe são fundamentais para o desenvolvimento económico e social do Algarve, sendo responsáveis pelo combate à sazonalidade e na criação de postos de trabalho, direta e indiretamente. A água é indispensável para a manutenção dos mesmos e é fulcral que seja bem gerida e reaproveitada de modo a preservar este bem tão precioso. Após consultar literatura, ficou evidente que a informação em relação à caracterização da rega nos campos de golfe no Algarve é escassa e parca em informação, não podendo ser utilizada pelos Diretores de Manutenção (Greenkeepers) para uma gestão mais eficiente e comparativa. Neste sentido, num universo de 33 campos, foi feito um inquérito a 32 campos de golf de 18 buracos ou mais, onde tivemos a resposta de 30 (93,8%), solicitando a informação dos consumos mensais de água na rega dos respetivos campos desde 2016. De modo a corroborar os dados e obter informação extra, foi feita uma parceria entre a APG (Associação Portuguesa de Greenkeepers) e a UAlg (Universidade do Algarve). Os resultados obtidos permitem-nos aferir: (1) a área média dos campos de golfe no Algarve é de 37,3 ha e que 2/3 dessa área é constituída por relvas de estação quente; (2) a rega média anual nps campos de golfe de 18 buracos é de 370.500 m³ correspondendo a 9.932 m³/ha.ano; (3) 80 % da rega é efetuada em 5 meses nos meses de maio a setembro e 50 % em 3 meses, de junho a agosto; (4) A rega varia de forma indiretamente proporcional com a variação de evapotranspiração, que nestes 6 anos de estudo chegou aos 18%; (5) A Covid-19 teve impacto (redução) nas quantidades regadas em 2019 devido ao encerramento dos campos de golfe.

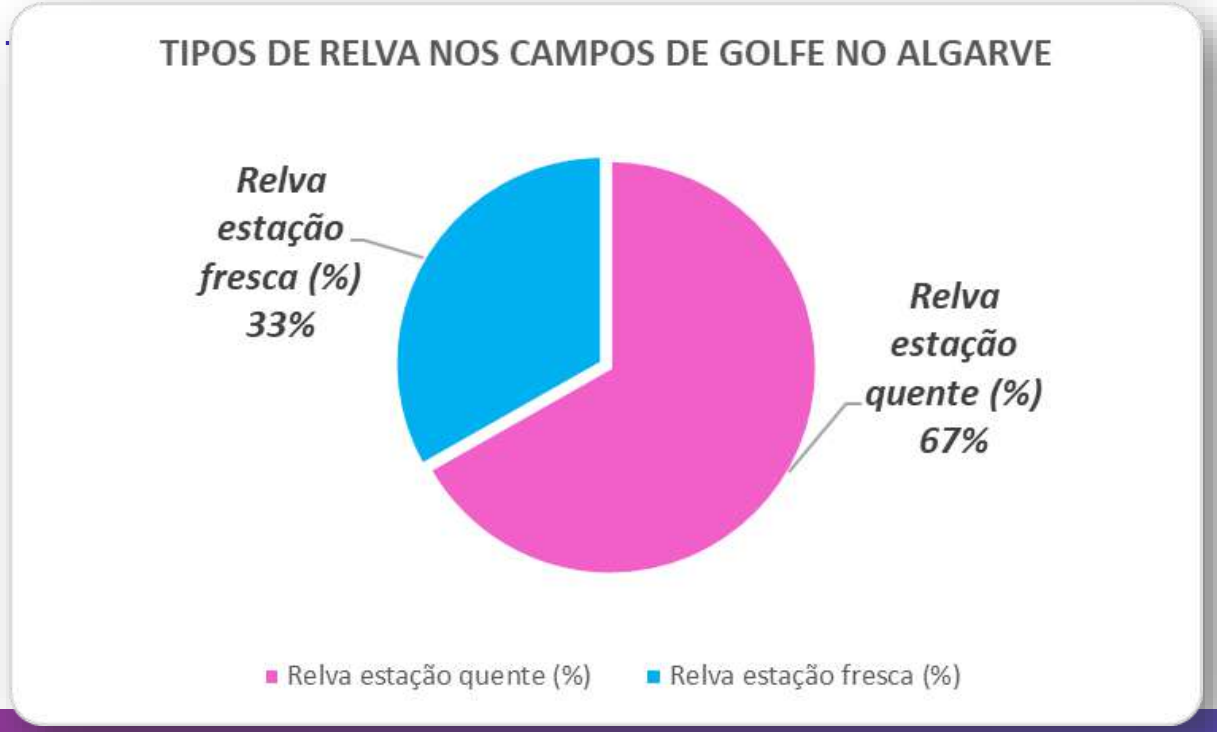
Keywords: Golf, Irrigation, Algarve, Sports turf, Greenkeeping

ii. Abstract

The golf courses are fundamental to the economic and social development of the Algarve, being responsible for combating seasonality and creating direct and indirect jobs. Water is essential for their maintenance, and it is crucial to manage it properly and reuse it, has much as possible, to preserve this precious asset. After consulting the literature, it became evident that the information regarding the characterization of irrigation on golf courses in the Algarve is scarce and sparse and cannot be used by Maintenance Directors (Greenkeepers) for a more efficient and comparative management. With this in mind, a survey was carried out on 32 golf courses with 18 holes or more in a universe of 33 courses, to which we received a response from 30 (93.8%), requesting information on monthly water consumption in the irrigation of the respective courses since 2016. To corroborate the data and obtain extra information, a partnership was established between APG (Portuguese Association of Greenkeepers) and UAlg (University of Algarve). The results obtained allow us to assess: (1) the average area of golf courses in the Algarve is 37.3 ha and that 2/3 of this area is constituted by warm season grasses; (2) the average annual irrigation on golf courses is 370.500 m3 corresponding to 9.932 m3/ha.year; (3) 80% of watering is done in 5 months from May to September and 50% in 3 months from June to August; (4) Irrigation varies indirectly proportionally with the variation of evapotranspiration, which in these 6 years of study reached 18%; (5) Covid-19 had an impact (reduction) in the quantities watered in 2019 due to the closure of golf courses.

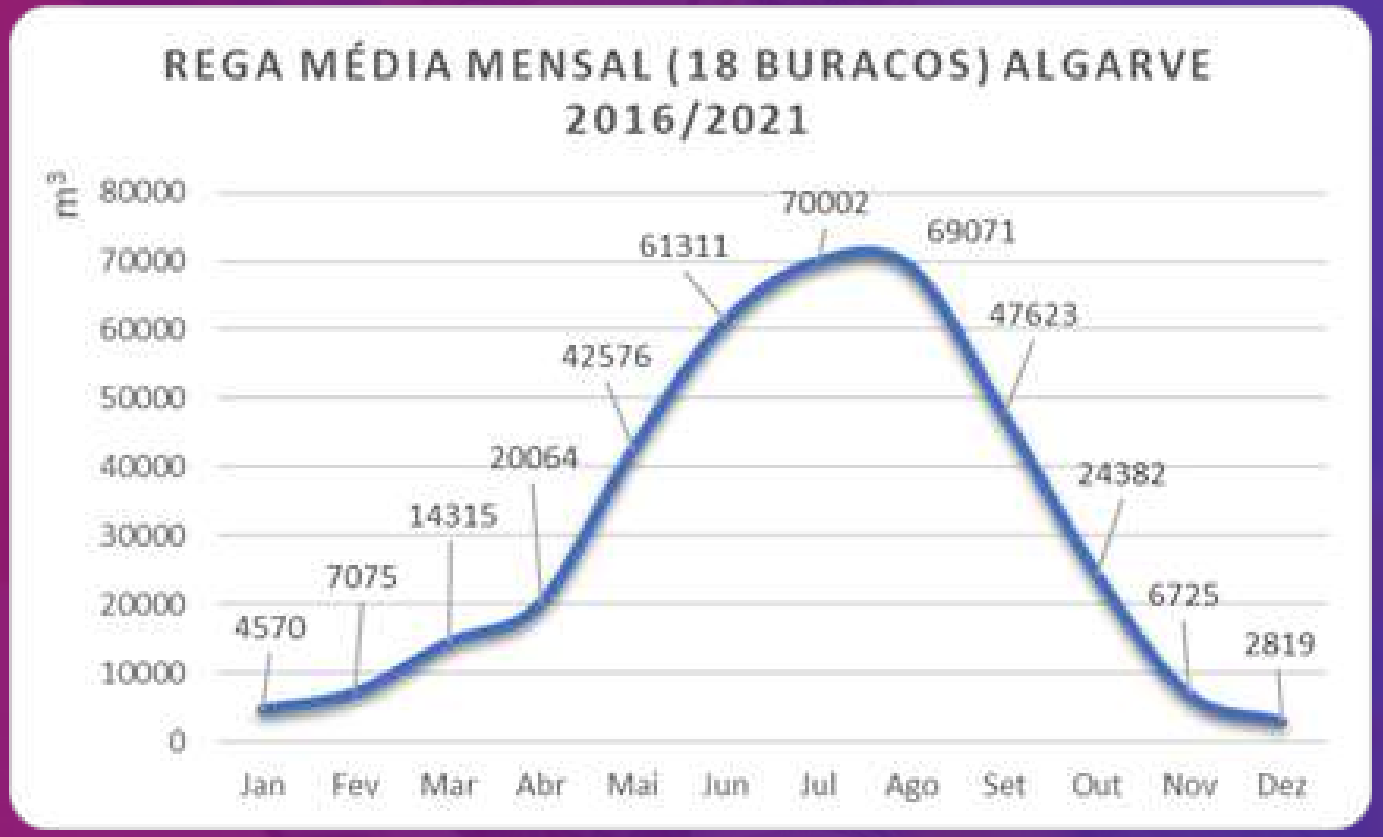
WARM SEASON GRASSES (C4 - Blue) vs COLD SEASON GRASSES (C3 - Pink)



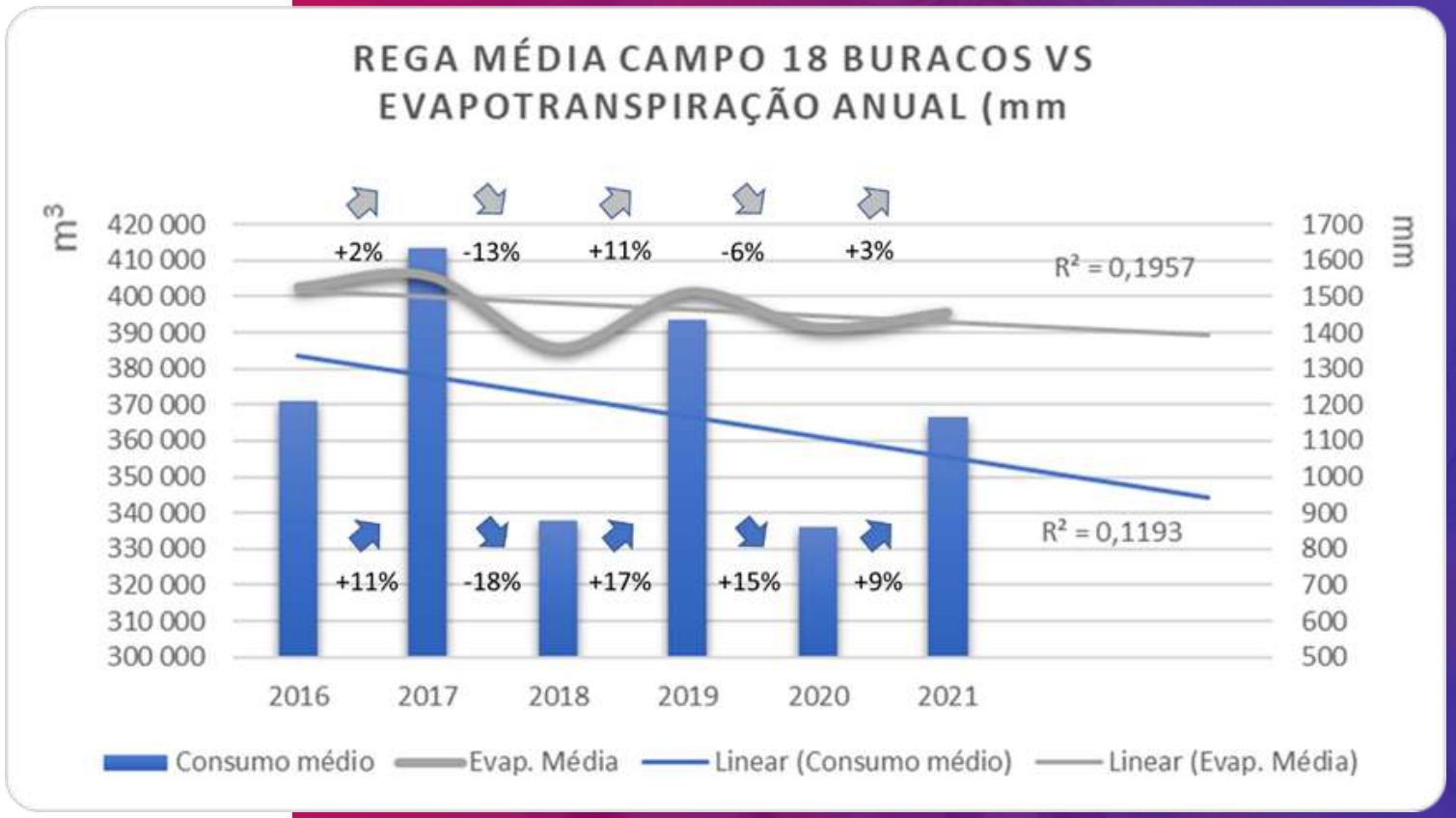


AVERAGE MONTHLY CONSUMPTION

2016-2019



ANNUAL VARIATION



CONCLUSIONS

- In the Algarve, golf courses are composed of 2/3 of warm season grass and 1/3 of cold season grass, in an average area of 37.3 hectares per 18 holes *2025*

- The average irrigation for 18 holes in the Algarve is around 370,500 m3, so, the average irrigation per hectare on golf courses is less than 10,000 m3/ha.year,

- 80% of this watering occurs from May to September and 50% in three months, from June to August.

- IMPORTANT NOTE: Biggest production of recycled water!!

Nothing beats showing solid data to grass skeptics…

WHAT ARE GOLF COURSES DOING ABOUT WATER REDUCTION?

A

Water for Reuse

The courses are adapting to the new resources.

B

Reduce lawn areas

Reduce the areas, maintaining the soul of the course

C

Warm Season Gresses

Warm season grass (C4) is best adapted to the lack of water

D

Improved efficiency and control

New tools and equipment to ensure efficient watering

AUDITS

29-4-2024

Evaluation of Current Irrigation System at Monte Rei Golf Club

Location: Vila Nova do Cacelo, Portugal

imaginieur

Independent Irrigation Consultants

WHERE DOES THE WATER GO?

SPRINKLER REPLACEMENT

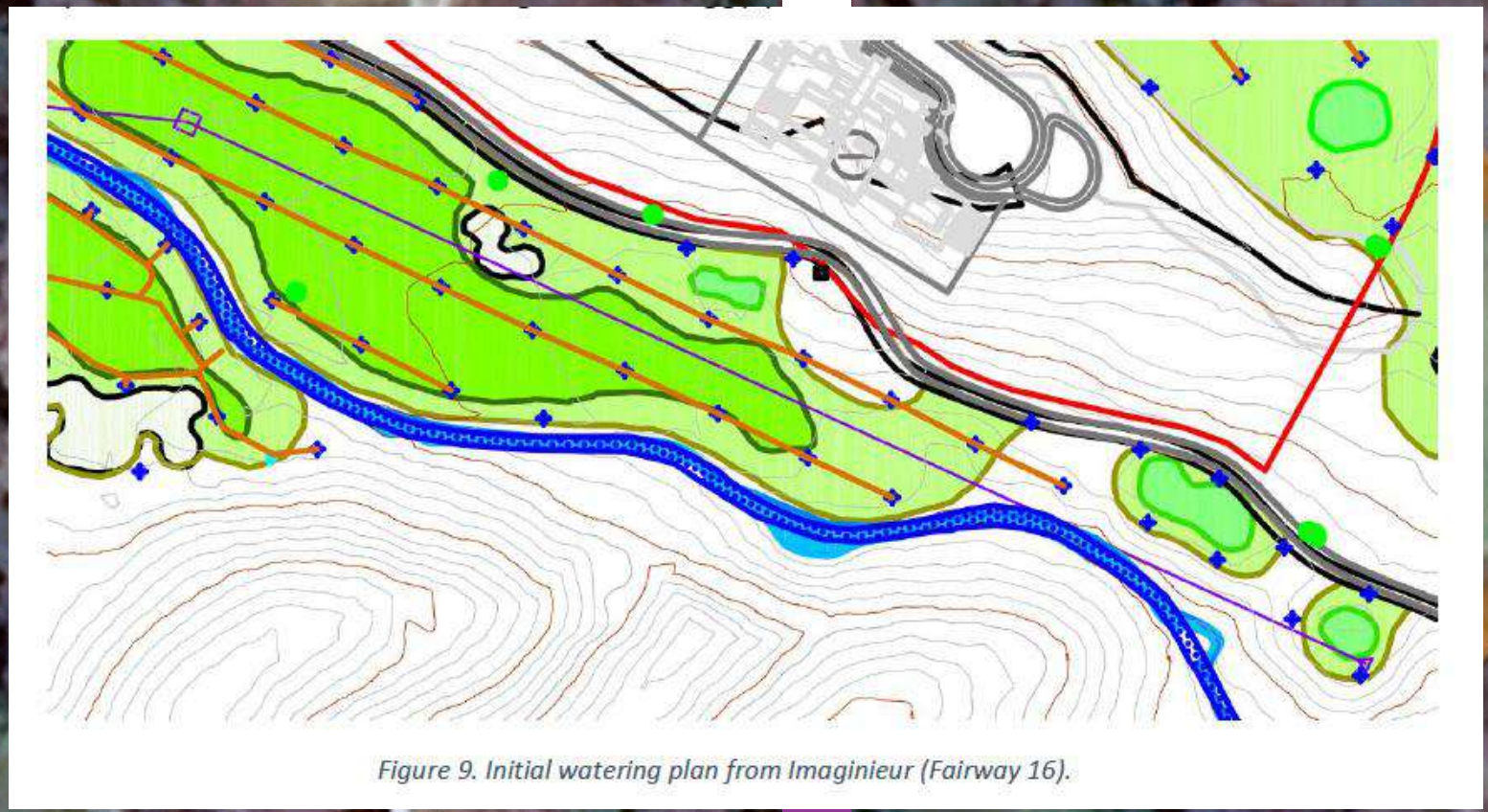


Figure 9. Initial watering plan from Imaginieur (Fairway 16).

GOLF COURSE USING ApR (Grey Water)

SALGADOS GOLF CLUB

Quinta.do.Vale Golf Resort

CASTRO MARIM GOLFE & COUNTRY CLUB

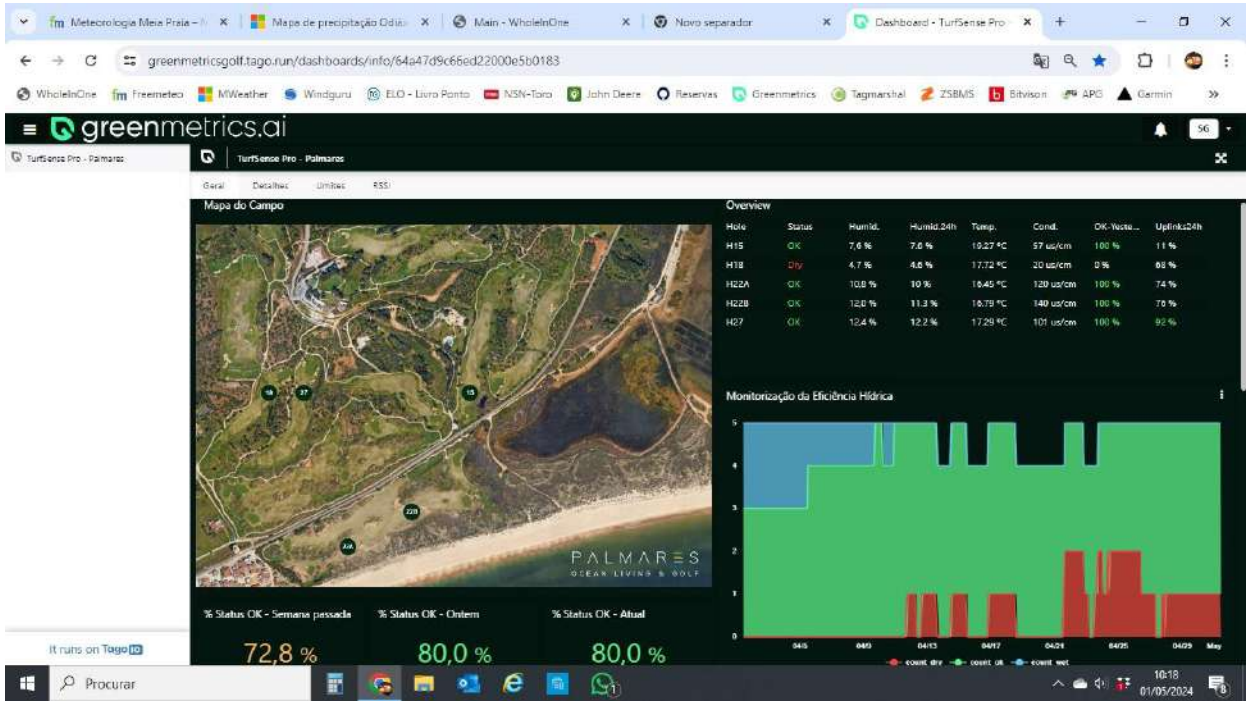
SAN LORENZO GOLF CLUB ALGARVE

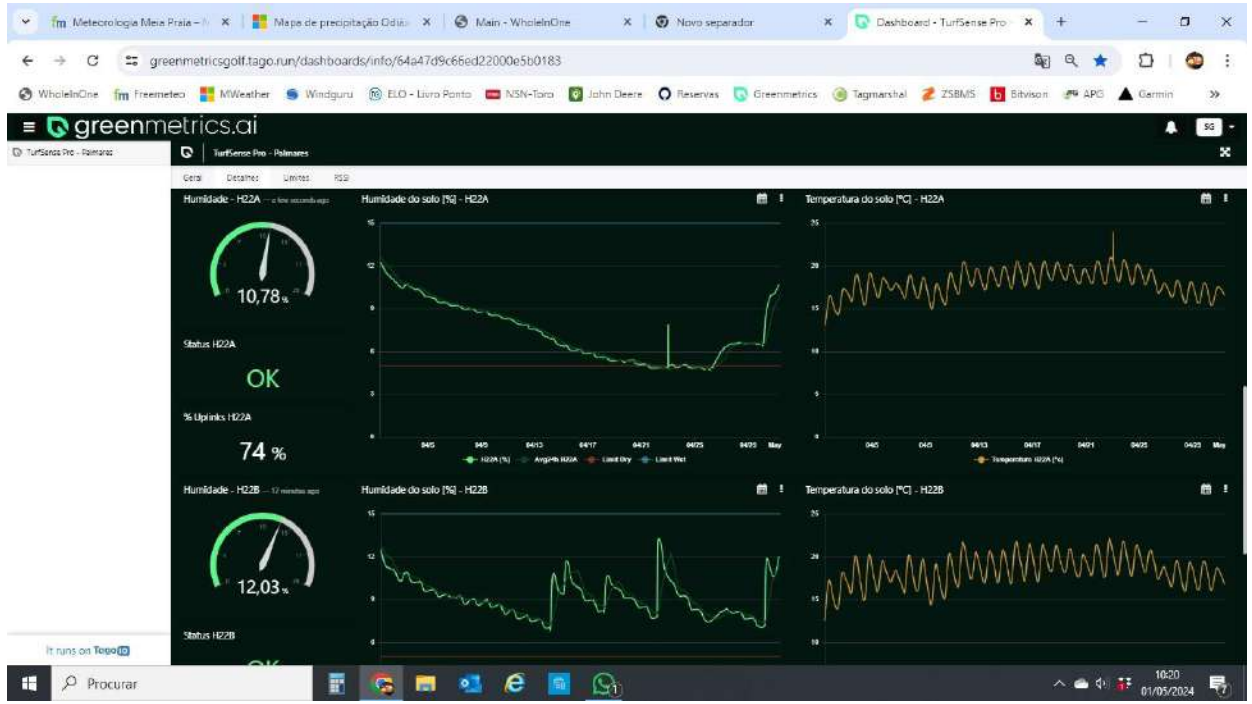
Vale da Pinta PESTANA GOLF RESORT

Gramacho PESTANA GOLF RESORT

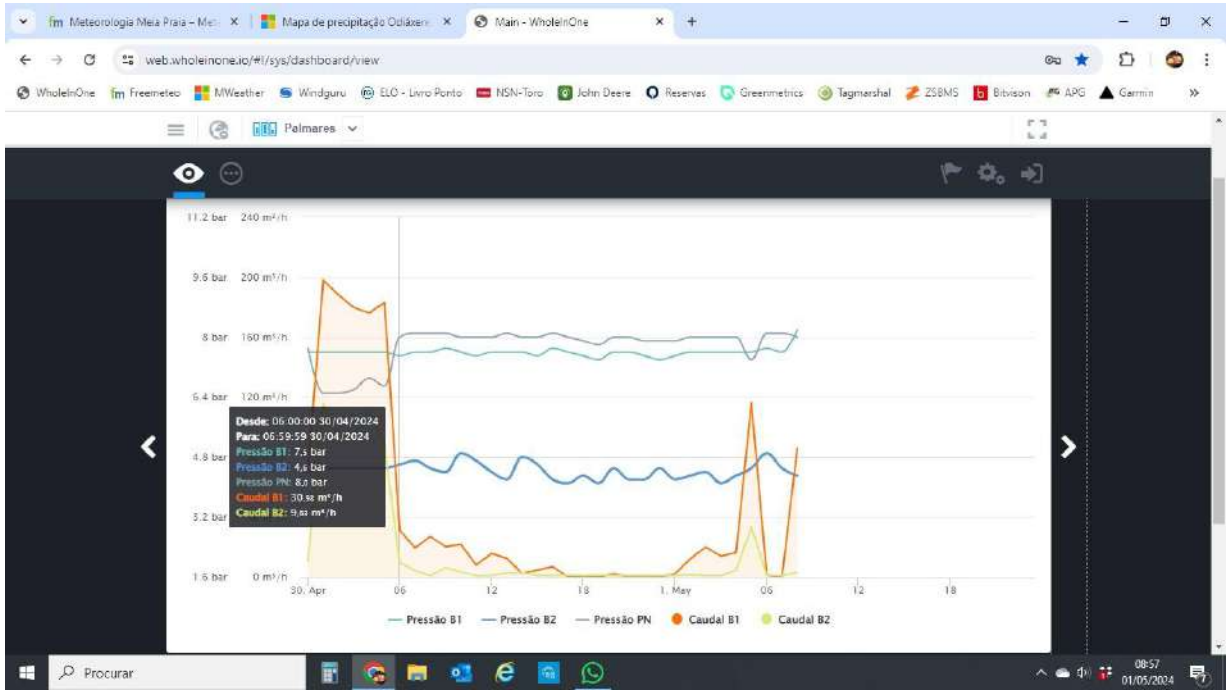
USE OF HUMIDITY PROBES

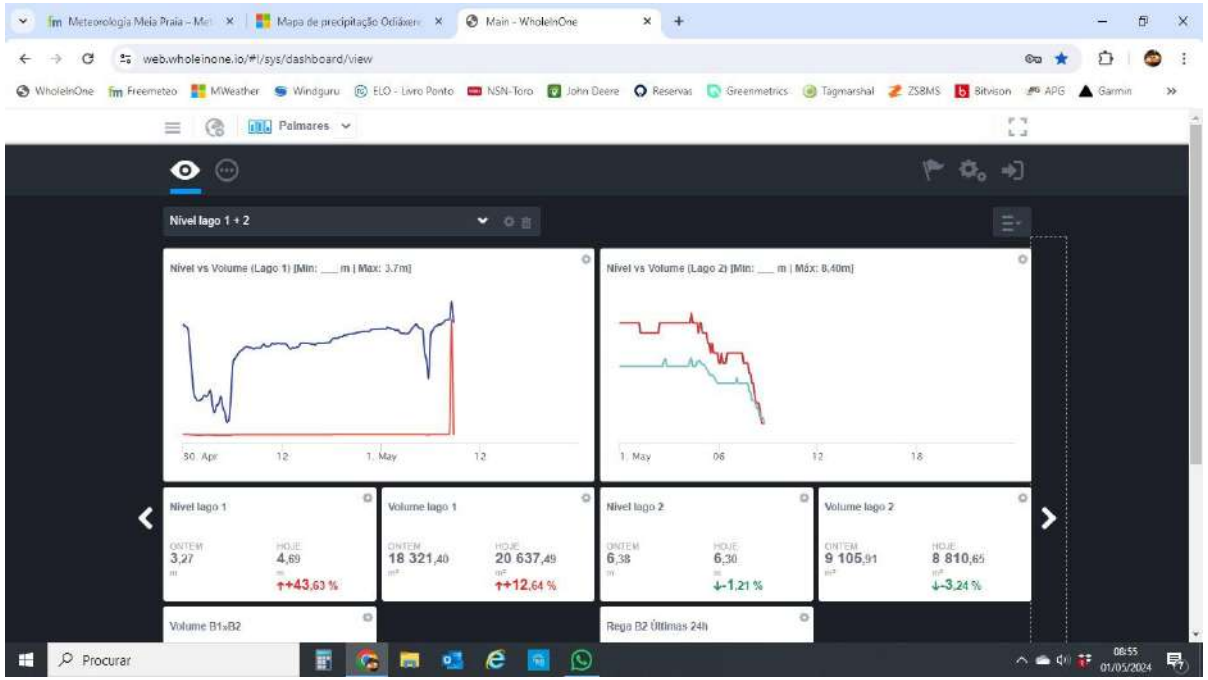
PALMARES
OCEAN LIVING & GOLF





STATE-OF-THE-ART PUMP STATIONS





REDUCTION OF IRRIGATED AREAS

AMENDOEIRA
GOLF RESORT

REDUCTION OF IRRIGATED AREAS

AMENDOEIRA
GOLF RESORT

CONVERSION C3>C4 (Bermuda)

Quinta da Ria
Ria & Cima Golf Courses

LET'S BE OPTIMISTIC!

We need to be ready for whatever challenges come our way...

2024

OBRIGADO

Joel Nunes