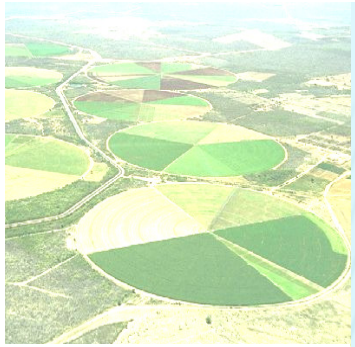
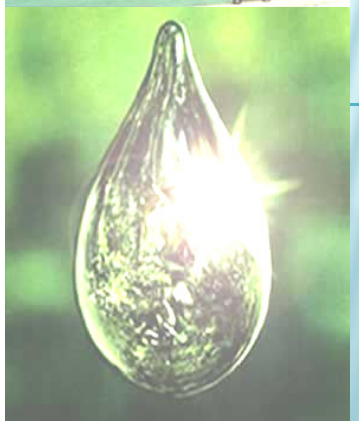




APOIO AO IRRIGANTE:

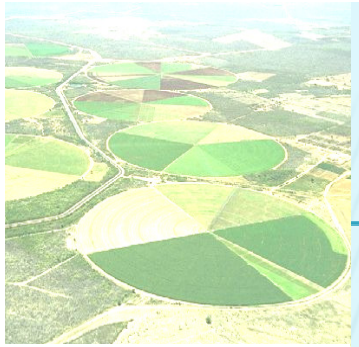
O MANEJO DA IRRIGAÇÃO COM O CIMIS

CALIFORNIA IRRIGATION MANAGEMENT INFORMATION SYSTEM

Discentes: Maria Eliza Falaschi Nucci

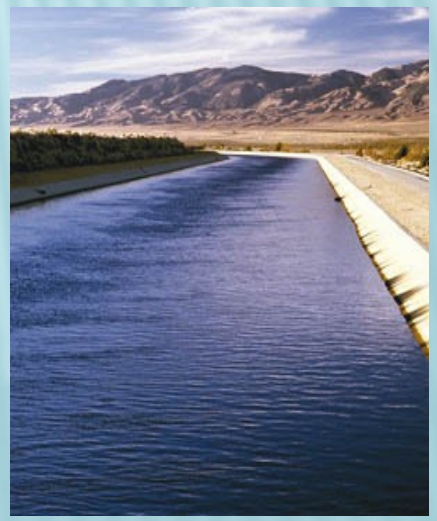
Patrícia Helena Junqueira

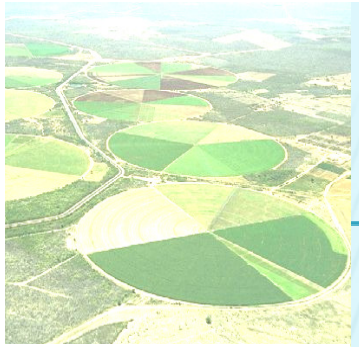
Prof. Dr. Fernando Braz Tangerino Hernandez



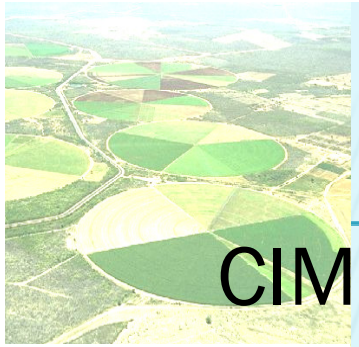
California Irrigation Management Information System - CIMIS

- Office of Water Use Efficiency (OWUE),
- Department of Water Resources (DWR)

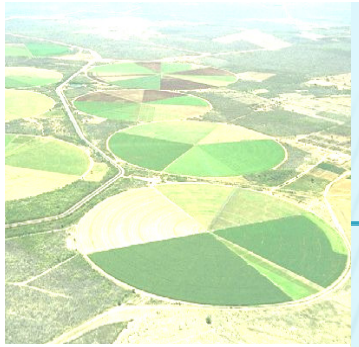




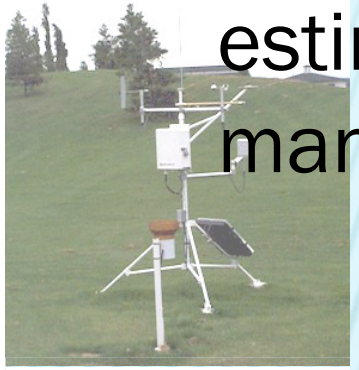
http://wwwcimis.water.ca.gov



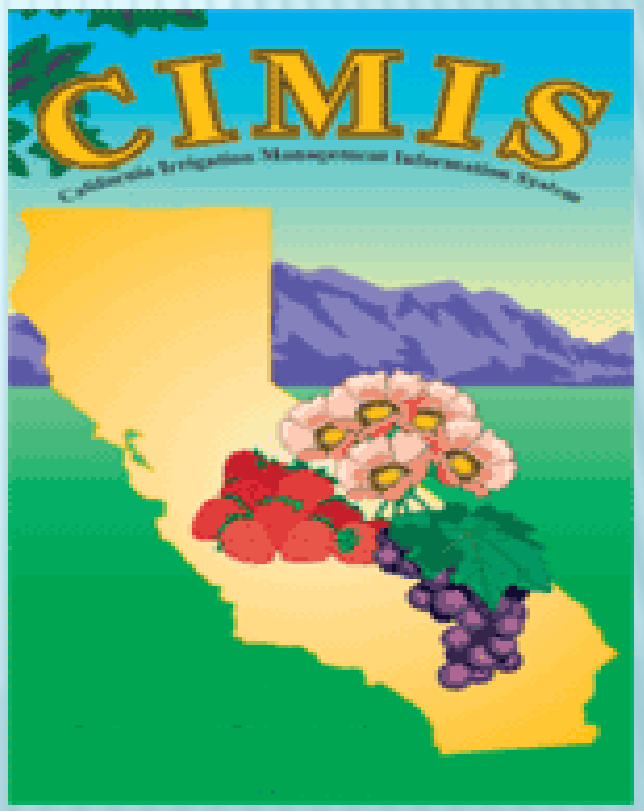
CIMIS foi criada em 1982 como um projeto conjunto entre a Universidade da Califórnia, em Davis (UCD) e DWR. DWR assumiu a gestão do programa CIMIS em 1985



Ajudando a gerir os seus recursos hídricos de forma eficiente, visando economia de água, energia e dinheiro.

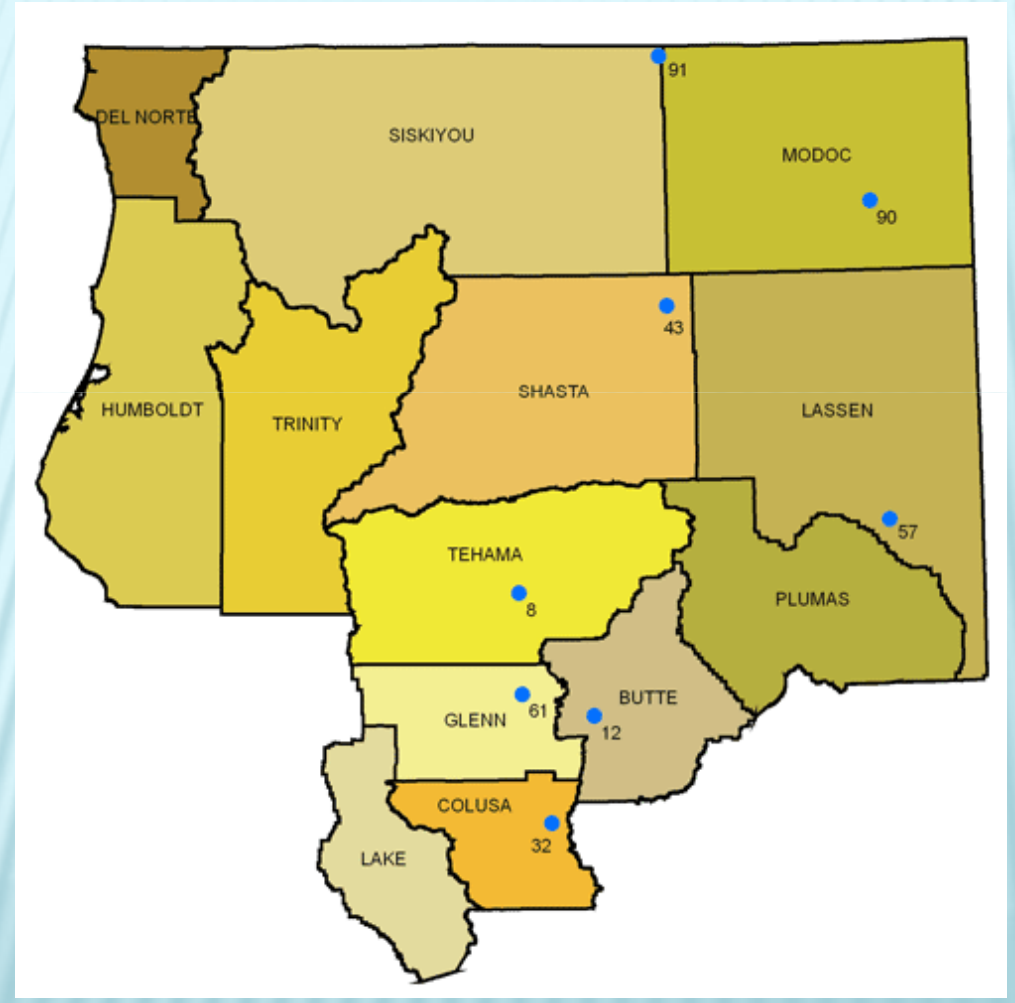


O principal de CIMIS era tornar acessível ao público, gratuitamente, informações úteis na estimativa de colheita e para uso da água no manejo da irrigação.

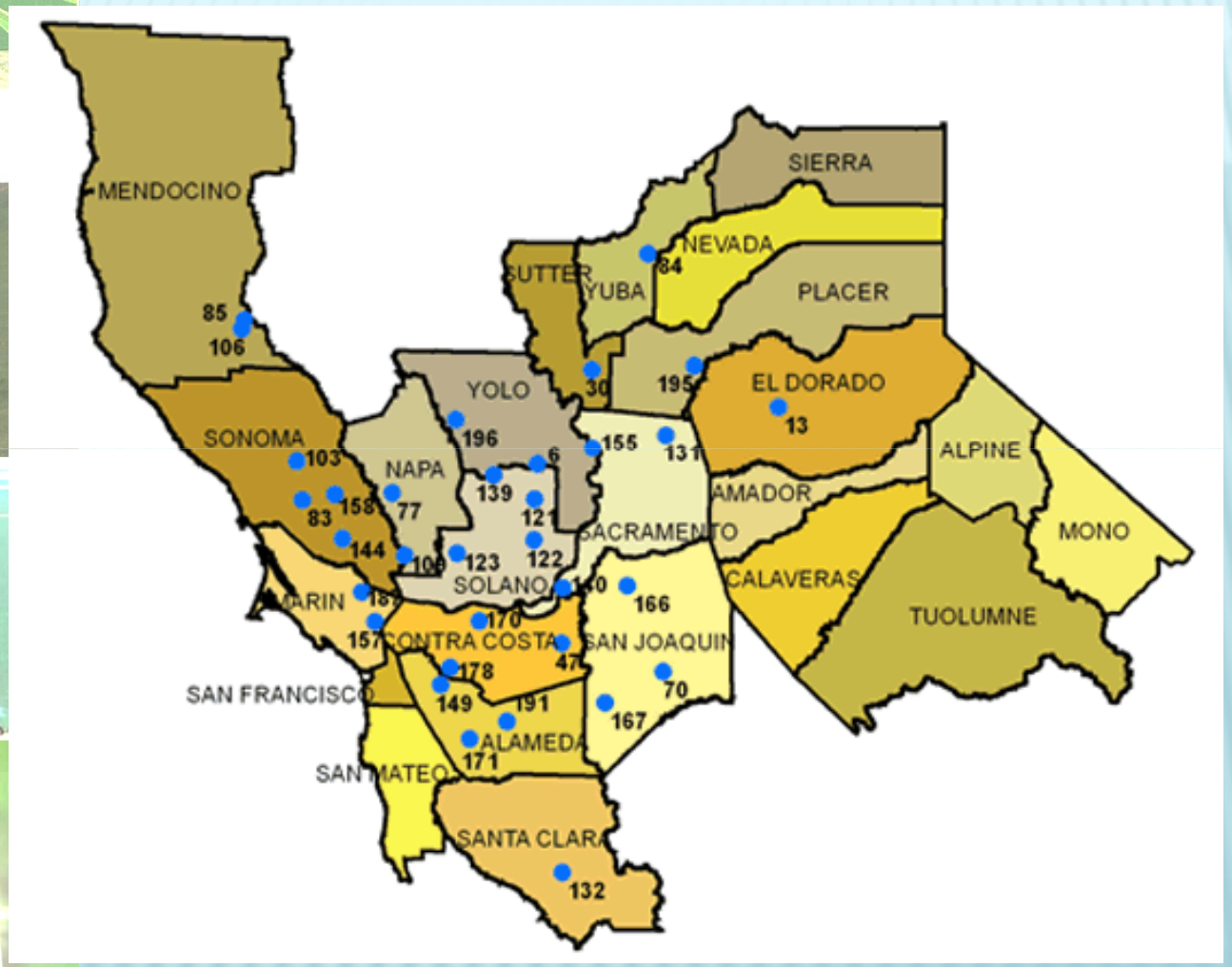


- CIMIS é uma rede integrada de mais de 125 estações meteorológicas automaticas ativas localizadas em toda a Califórnia.

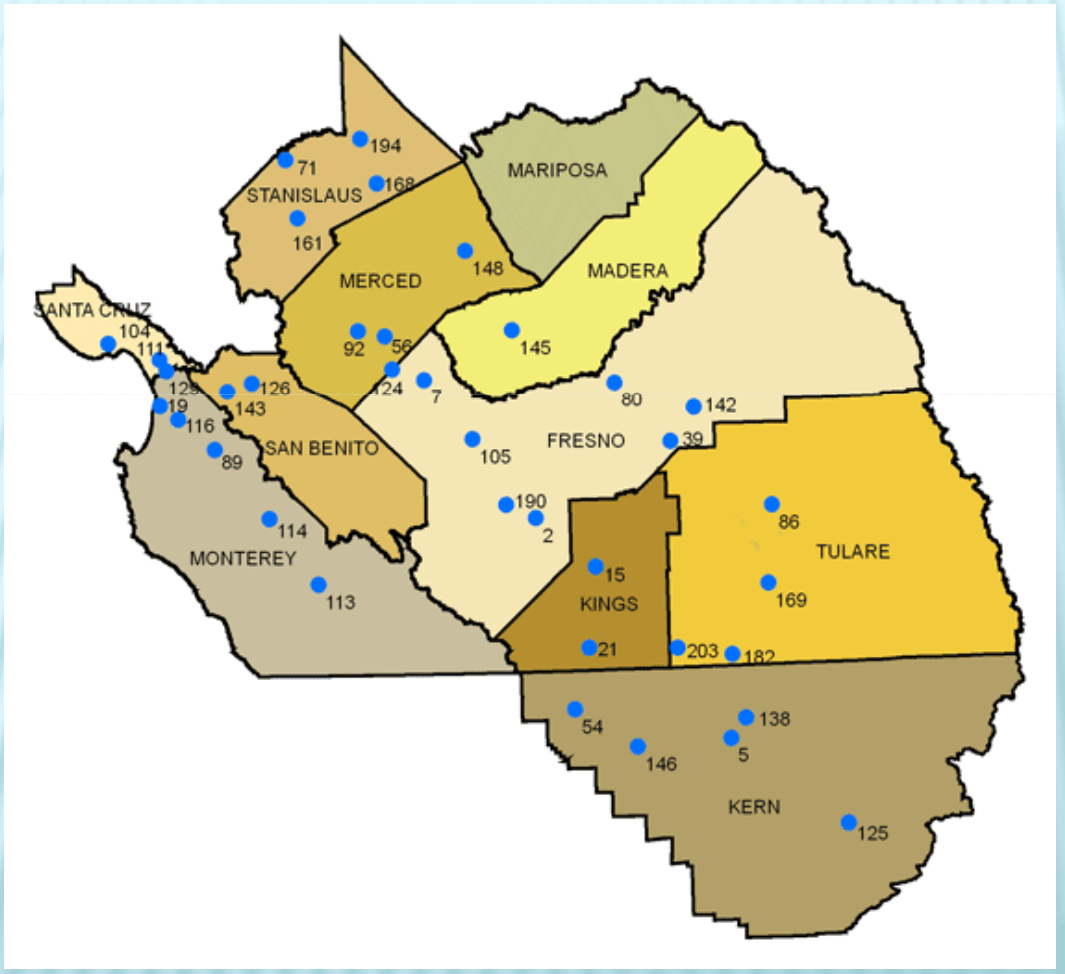
Distrito Norte



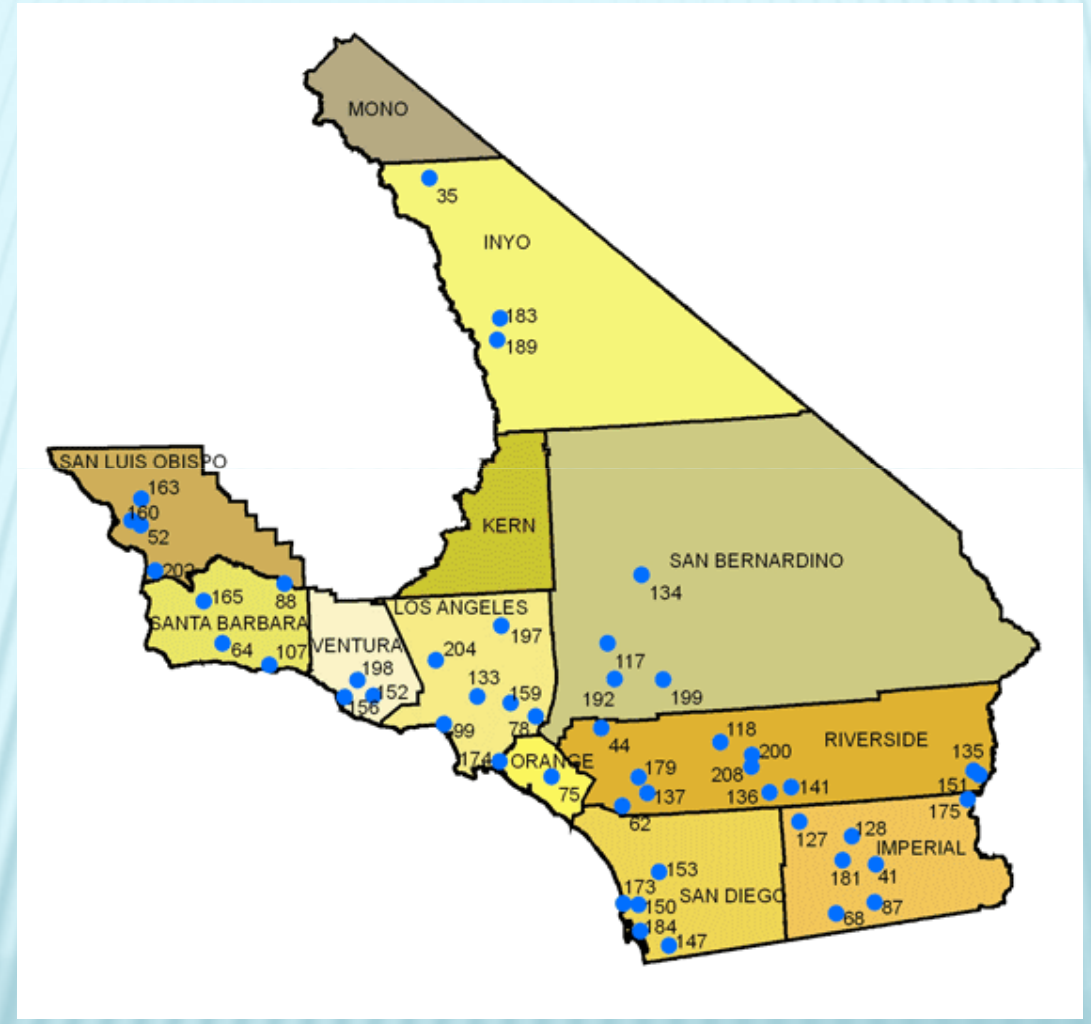
Distrito Central



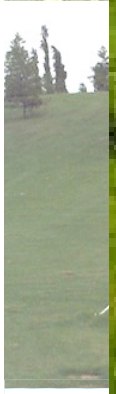
DISTRITO DE SÃO JOAQUIM



Distrito Sul

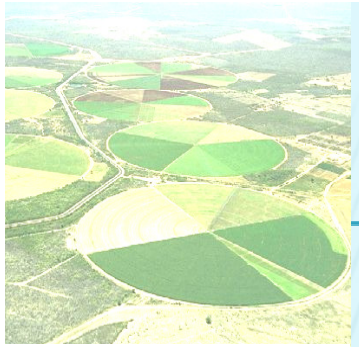


1. radiação solar total (piranômetro)
2. A temperatura do solo (termistor)
3. Temperatura do ar / umidade relativa (HMP35)
4. Direção do vento (cata-vento)
5. Velocidade do vento (anemômetro)
6. Precipitação (caçamba-basculante pluviômetro

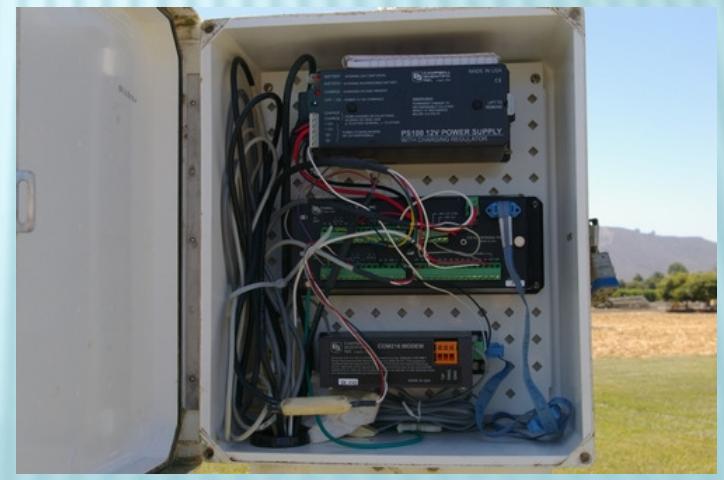


COMO FUNCIONA O CIMIS?

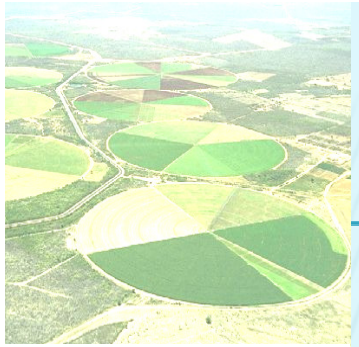
Informações tecnológicas são coletadas nas estações meteorológicas (minuto a minuto)



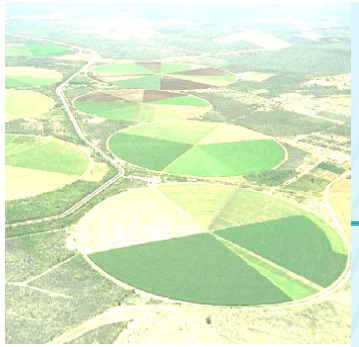
armazenadas temporariamente, em um datalogger posicionado nos mastro das estações.



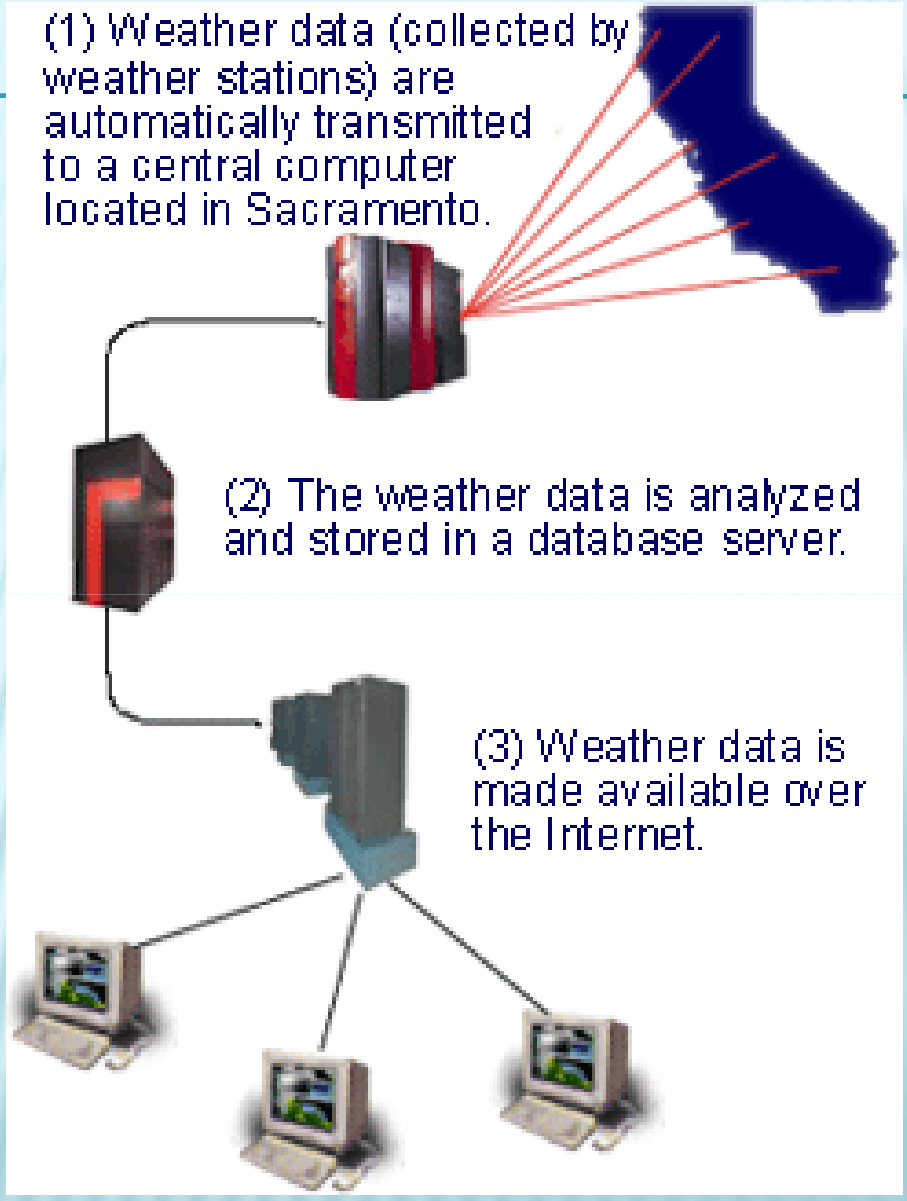
inside of CIMIS station



Um computador na sede do DWR, em Sacramento passa por todas as estações a partir de meia-noite, horário padrão do Pacífico e recupera os dados de cada dia.

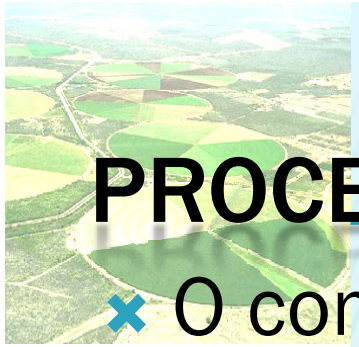


(1) Weather data (collected by weather stations) are automatically transmitted to a central computer located in Sacramento.



(2) The weather data is analyzed and stored in a database server.

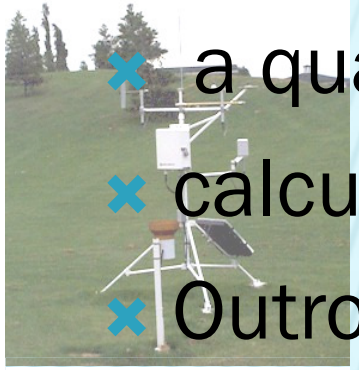
(3) Weather data is made available over the Internet.

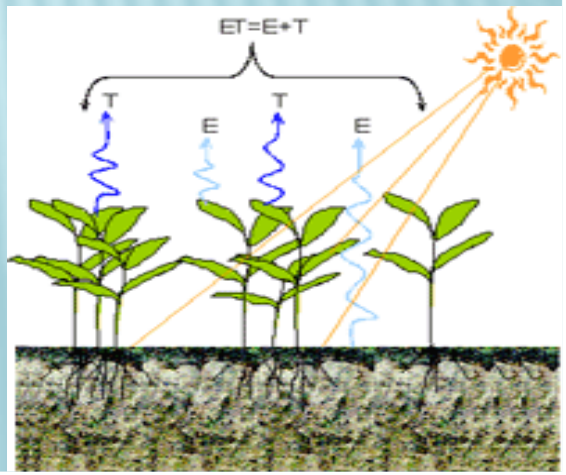


PROCESSAMENTO DE DADOS

- O computador central analisa:
- a qualidade dos dados,
- calcula evapotranspiração de referência
- Outros parâmetros intermediários (Rs, UR, Velocidade do vento)

e os armazena no banco de dados CIMIS.

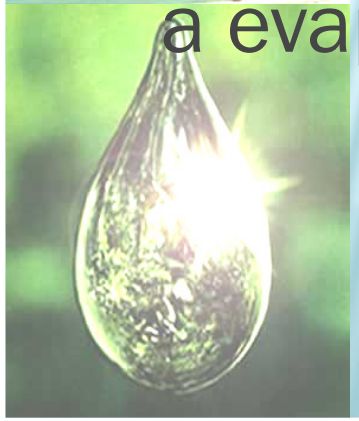




OS VALORES MEDIDOS:

- Radiação Solar: é utilizada no cálculo do saldo de radiação.

- Temperatura do ar: é usada no cálculo de outros parâmetros como a temperatura do ponto de orvalho, pressão de vapor, radiação, e a evapotranspiração de referência



- A temperatura do solo:

- Umidade Relativa: utilizados no cálculo da temperatura do ponto de orvalho, pressão de vapor, e a evapotranspiração de referência

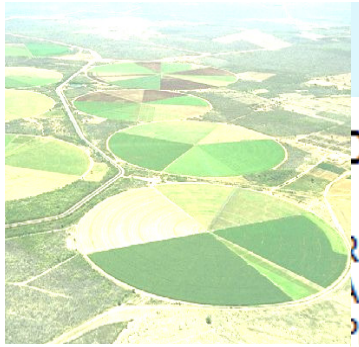
- Velocidade do vento:

- Direções do vento:

- Precipitação:

OS VALORES CALCULADOS:

- Saldo de radiação:
- Evapotranspiração de referência:
- Pressão do vapor:
- Temperatura do ponto de orvalho:



Daily Report

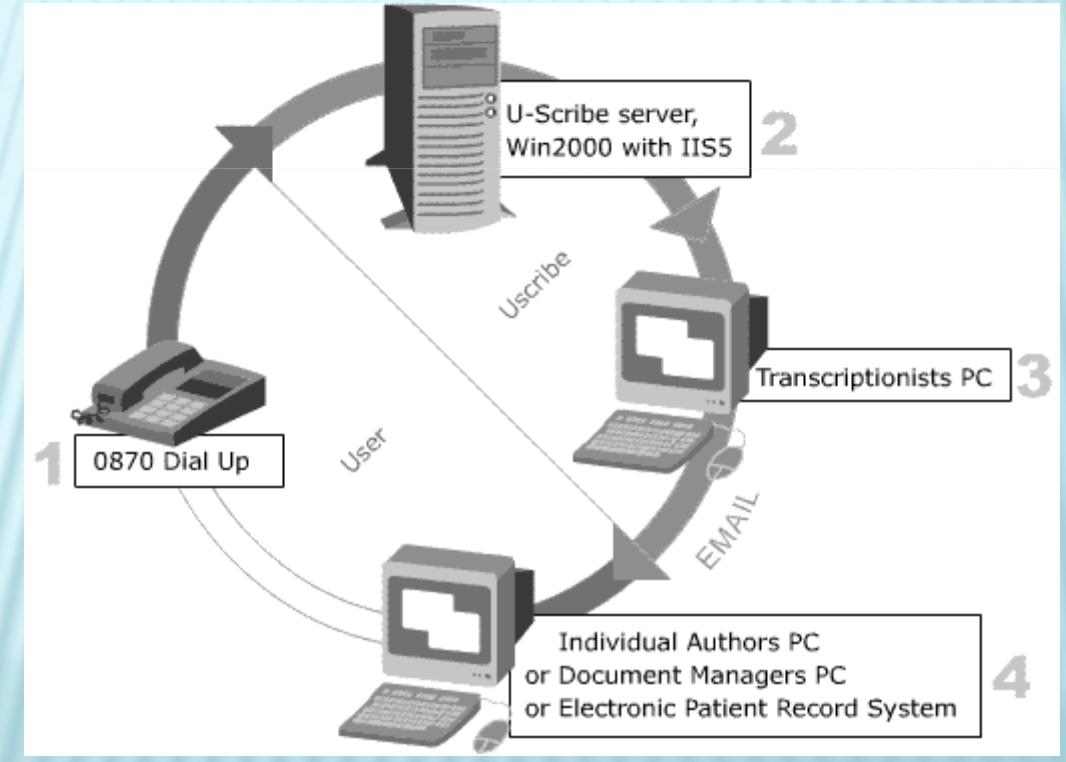
Rendered in Metric Units.
April 26, 2010 - May 2, 2010
Printed on May 3, 2010

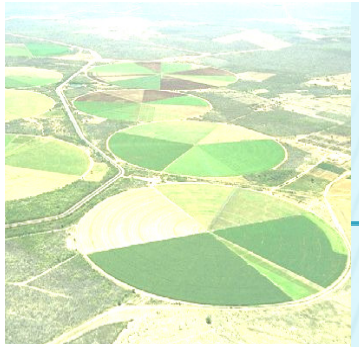
Pomona - Los Angeles Basin - Station 78

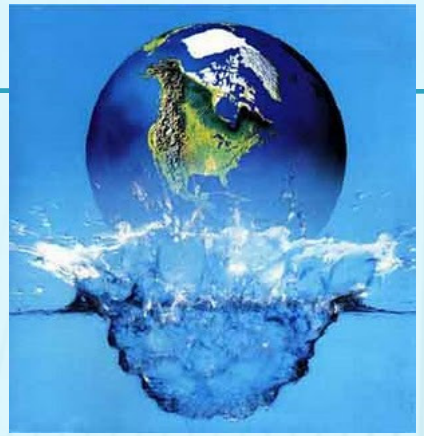
Date	CIMIS ETo (mm)	Precip (mm)	Sol Rad (W.sq.m)	Avg Vap (kPa)	Max Air Temp (°C)	Min Air Temp (°C)	Avg Air Temp (°C)	Max Rel Hum (%)	Min Rel Hum (%)	Avg Rel Hum (%)	Dew Pt (°C)	Avg wSpd (m/s)	Wnd Run (Km)	Avg Soil Temp (°C)
04/26/2010	5.26	0.00	315	1.4	25.9	9.4	17.0	94	49	72	11.9	1.2	100.4	17.9
04/27/2010	4.15	0.00	266	1.4	21.0	11.6	15.2	94	61	81	12.0	1.3	110.2	18.5
04/28/2010	4.15	3.40	272	1.2	19.2	9.8	14.4	94	55	75	9.9	1.4	119.8	18.7
04/29/2010	5.29	0.00	338 R	0.7	18.8	6.7	13.4	92	28	47	2.2	1.5	133.3	18.0
04/30/2010	5.19	0.00	333 R	0.8	21.6	5.3	13.7	85	30	51	3.7	1.1	97.5	17.6
Tots/Avgs	24.04	3.40	305	1.1	21.3	8.6	14.7	92	45	65	7.9	1.3	112.2	18.1

Flag Legend		
A - Historical Average	I - Ignore	R - Far out of normal range
C or N - Not Collected	M - Missing Data	S - Not in service
H - Hourly Missing or Flagged Data	Q - Related Sensor Missing	Y - Moderately out of range
Conversion Factors		
Ly/day/2.065=W/sq.m	inches * 25.4 = mm	(F-32) * 5/9 = c
mph * 0.447 = m/s	mBars * 0.1 = kPa	--

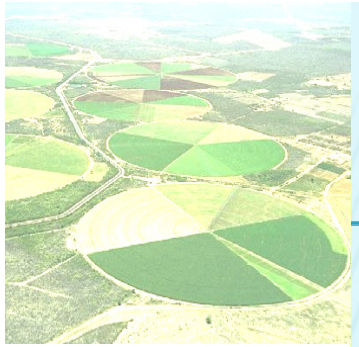
No passado, os usuários estavam acessando o banco CIMIS via dial-up e sistemas telnet

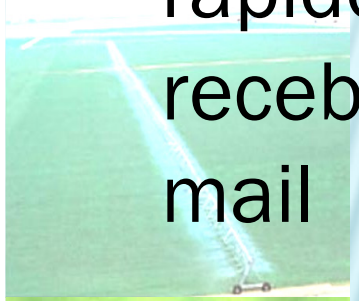






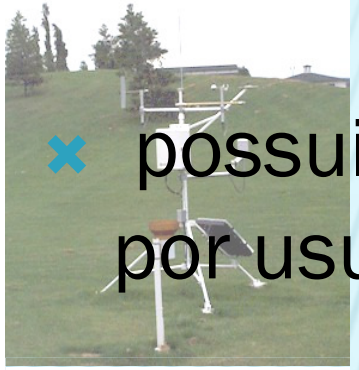
- Atualmente, o sistema web é a única plataforma para recuperar os dados CIMIS.





- Posso obter CIMIS dados entregues automaticamente para o meu e-mail?
  - Sim - o Agendador de Email é um recurso rápido e conveniente que permite aos usuários receber CIMIS dados automaticamente via e-mail

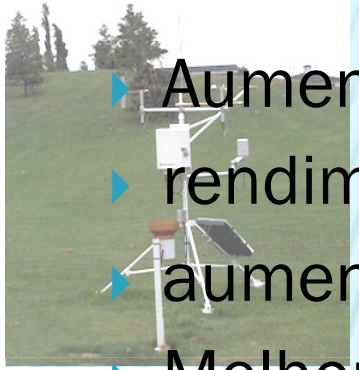
O IRRIGANTE:



- possui acesso gratuito e ilimitado de dados por usuários cadastrados CIMIS

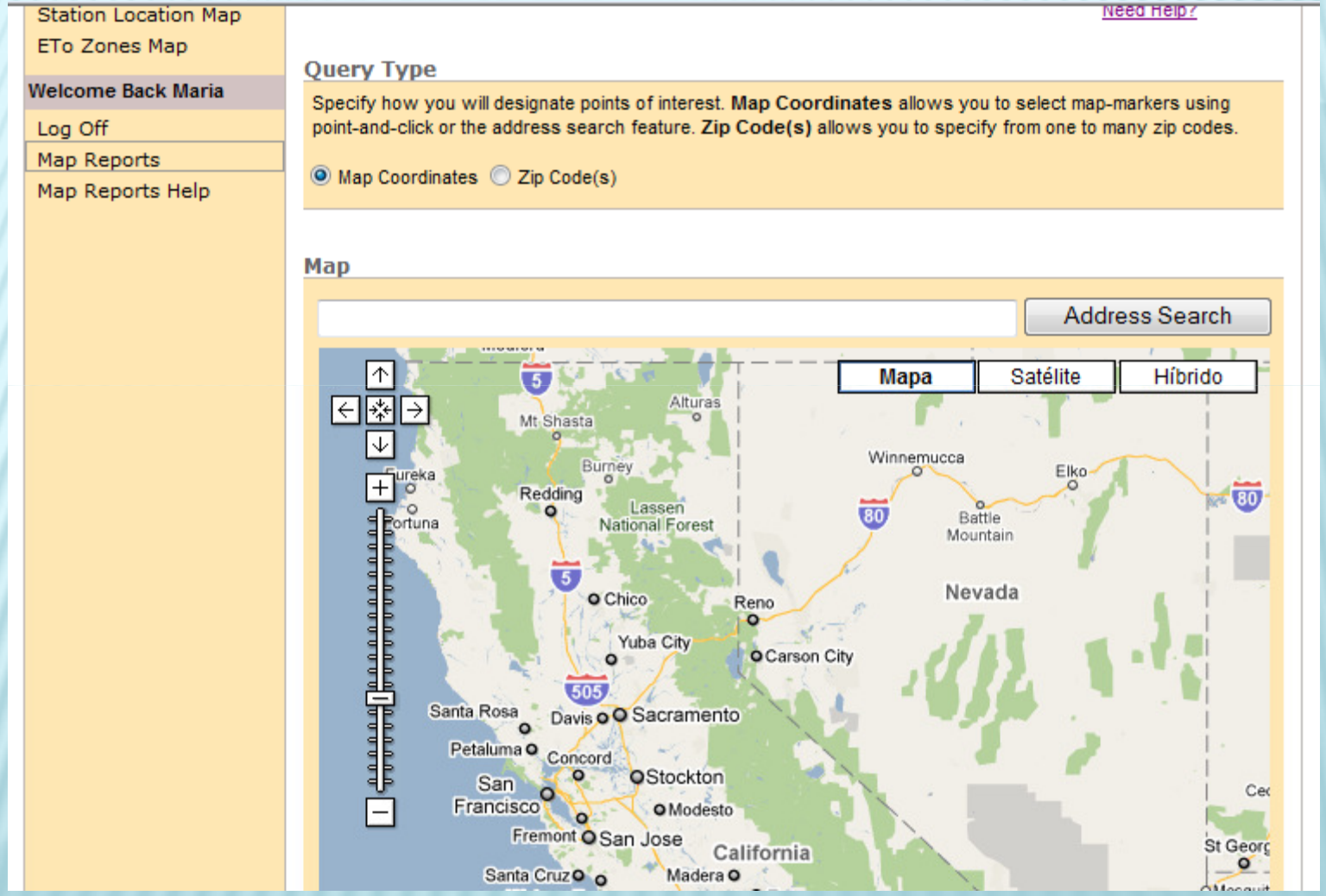
- Irrigantes podem usar de fatores da cultura, conhecidos como coeficientes de cultura, para converter ETo / ETr em uma evapotranspiração real (ETc) em um determinado estabelecimento.

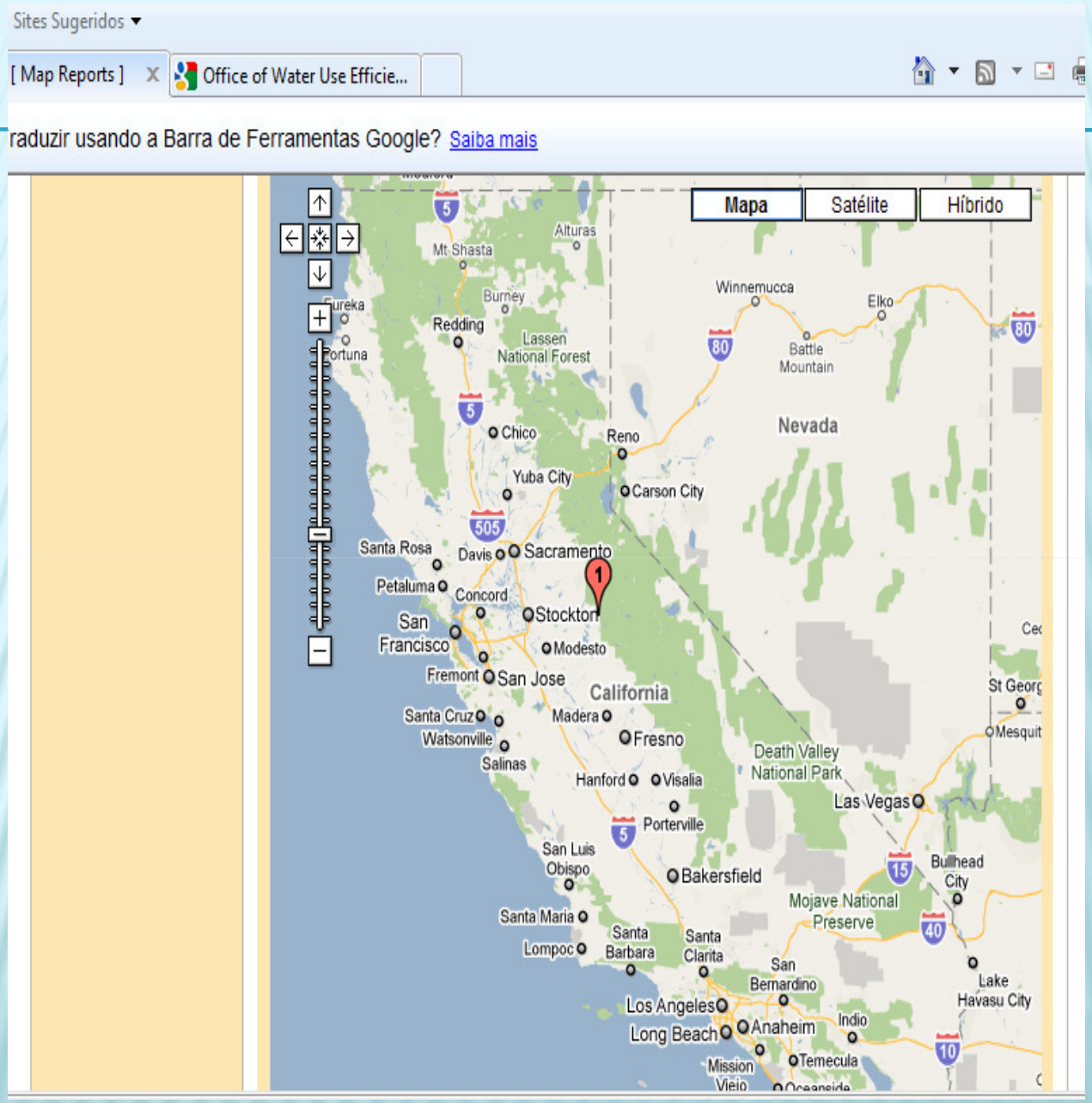
Melhorar o desempenho do seu sistema de irrigação tem várias vantagens:



- Aumento da eficiência de aplicação
- rendimentos mais elevados
- aumento dos lucros
- Melhoria da qualidade da água
- Diminuição da quantidade de água aplicada
- Diminuição do consumo de energia
- Diminuiu a lixiviação de nutrientes
- Diminuiu o escoamento da água da cauda

TIPOS DE CONSULTA

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California
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Madera
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Bakersfield
Bullhead City
Mojave National Preserve
Santa Maria
Lompoc
Santa Barbara
Santa Clarita
San Bernardino
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Temecula
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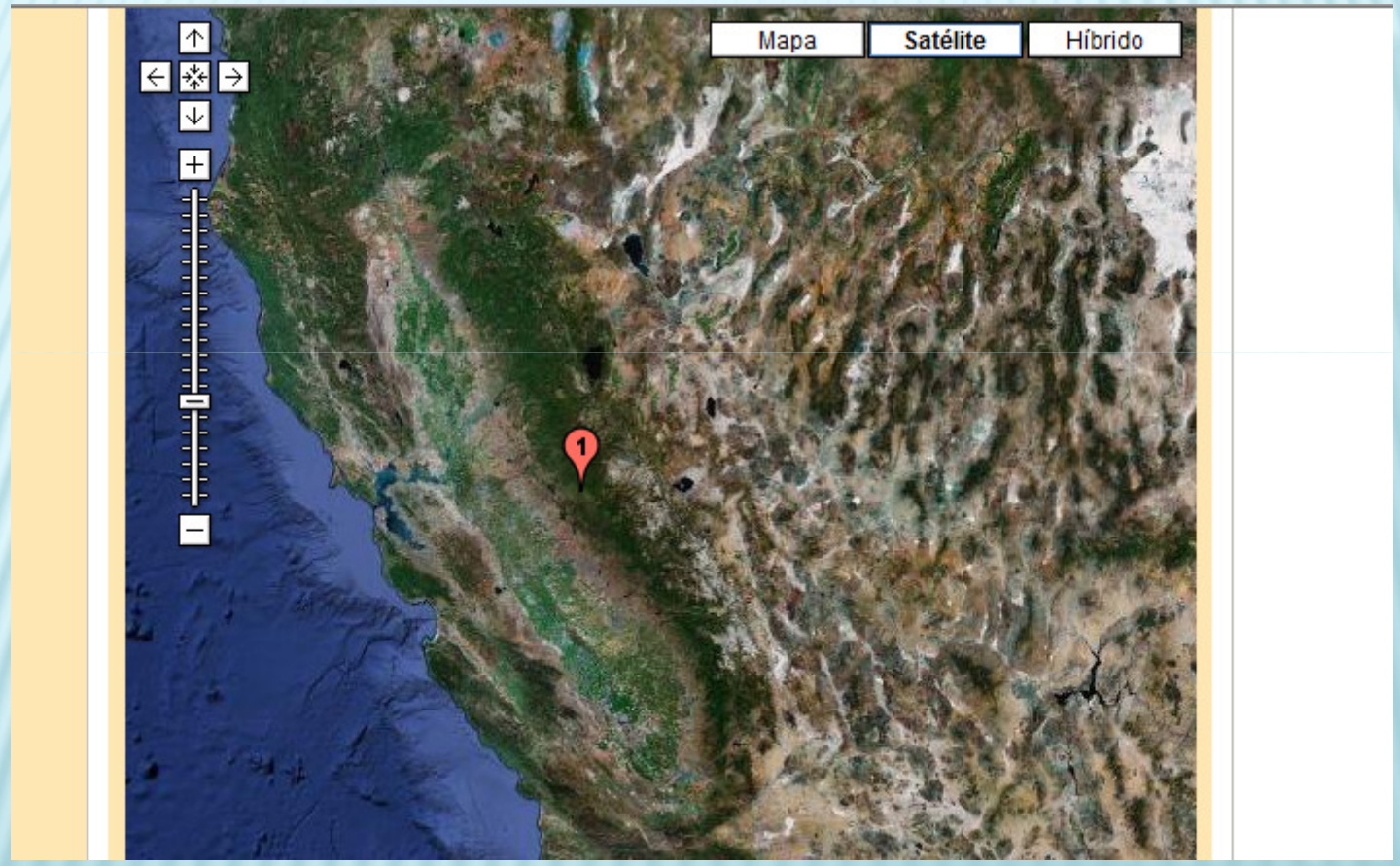
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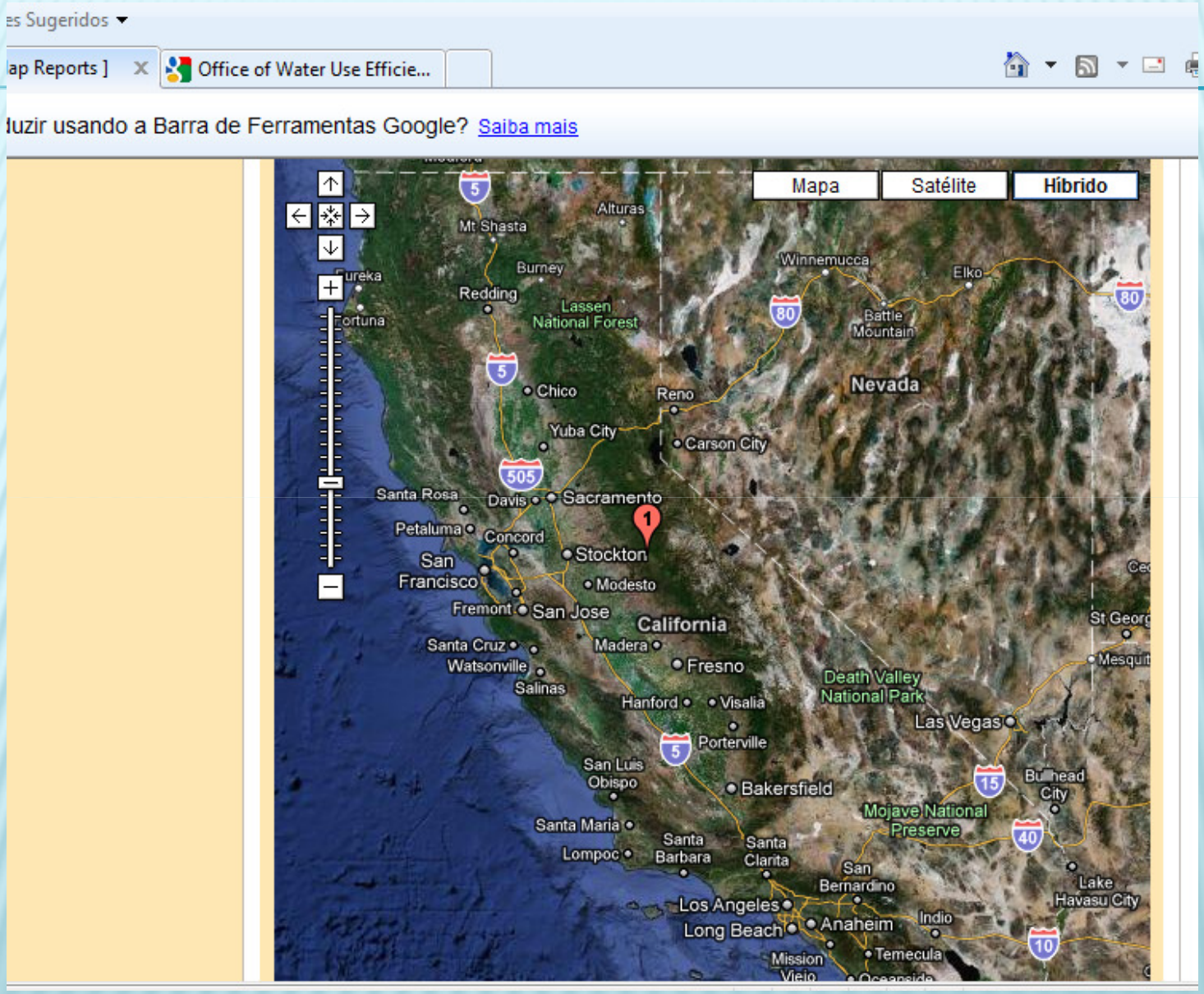
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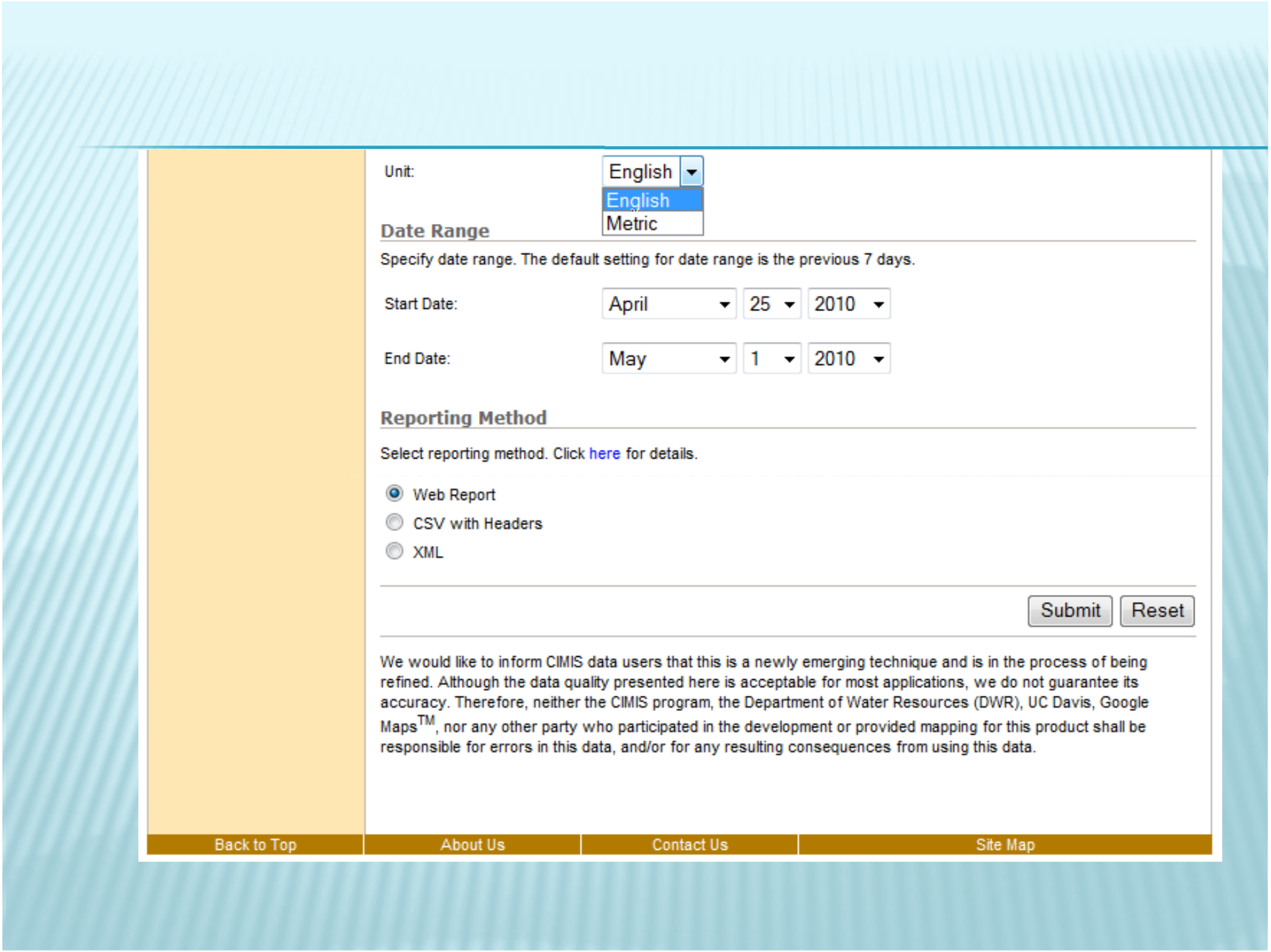
Chico
Yuba City
Santa Rosa
Davis
Sacramento
Petaluma
Concord
Stockton
San Francisco
Modesto
Fremont
San Jose
California
Santa Cruz
Watsonville
Salinas
Madera
Fresno
Hanford
Visalia
Porterville
Death Valley National Park
Las Vegas
San Luis Obispo
Bakersfield
Mojave National Preserve
Santa Maria
Lompoc
Santa Barbara
Santa Clarita
San Bernardino
Los Angeles
Long Beach
Anaheim
Indio
Temecula
Lake Havasu City
Mission Viejo
St Georg
Mesquit


Unit:
English
English
Metric
Date Range
Specify date range. The default setting for date range is the previous 7 days.
Start Date:
April
25
2010
End Date:
May
1
2010
Reporting Method
Select reporting method. Click here for details.
Web Report
CSV with Headers
XML
Submit
Reset
We would like to inform CIMIS data users that this is a newly emerging technique and is in the process of being refined. Although the data quality presented here is acceptable for most applications, we do not guarantee its accuracy. Therefore, neither the CIMIS program, the Department of Water Resources (DWR), UC Davis, Google Maps™, nor any other party who participated in the development or provided mapping for this product shall be responsible for errors in this data, and/or for any resulting consequences from using this data.
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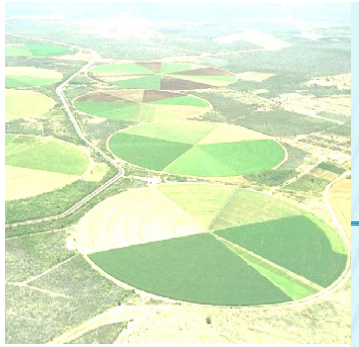
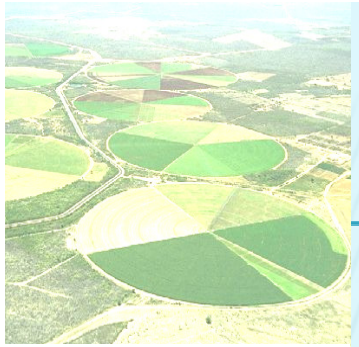
SOFTWARES UTILIZADOS

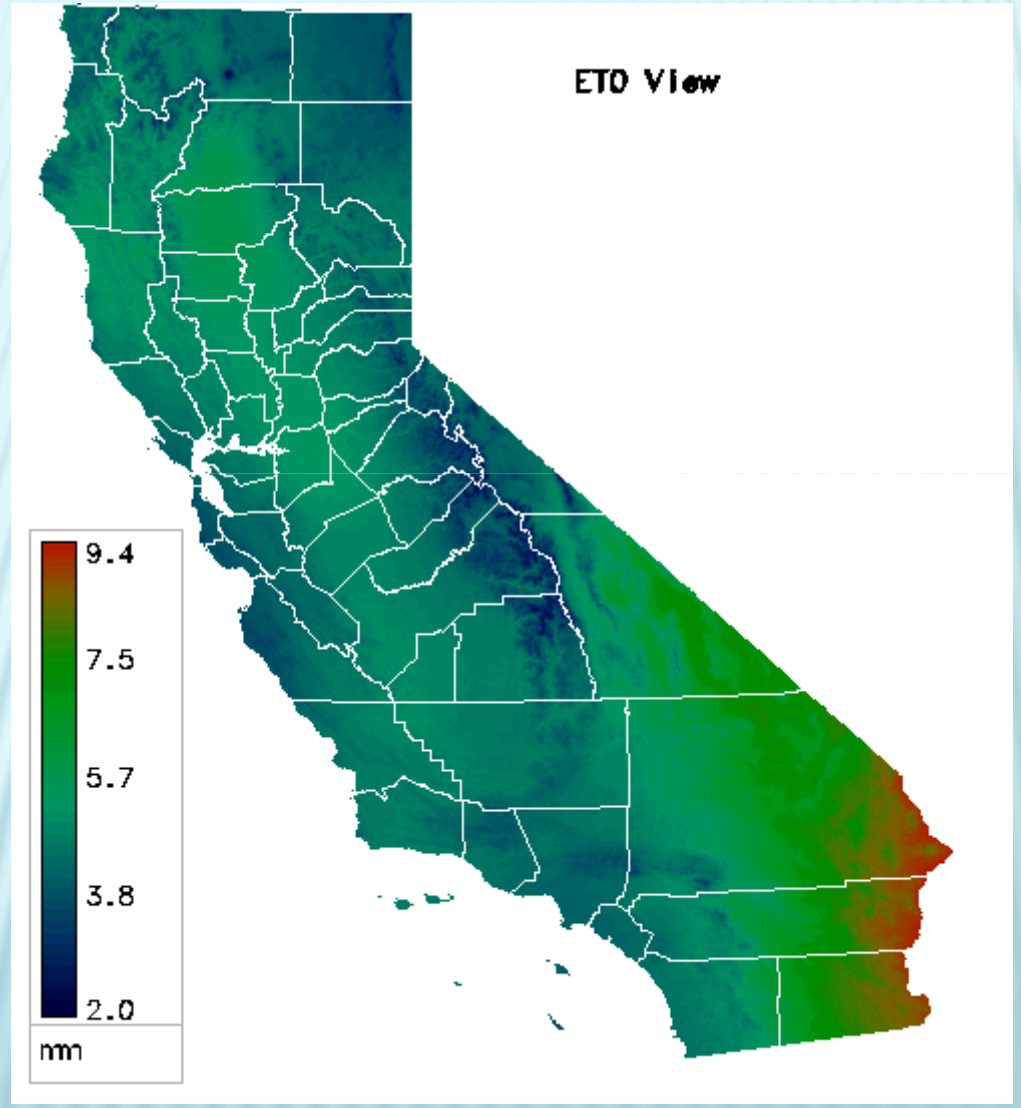
- Existem muitos programas de computador disponíveis para ajudar os produtores no manejo de irrigações.

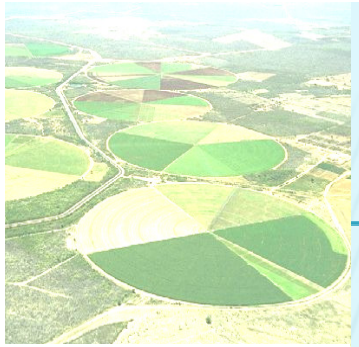


- A evapotranspiração de referência diária (ETo) o mapa é gerado pelo acoplamento dados de sensoriamento remoto por satélite a partir do ambiente operacional Geostationary Satélites (GOES).

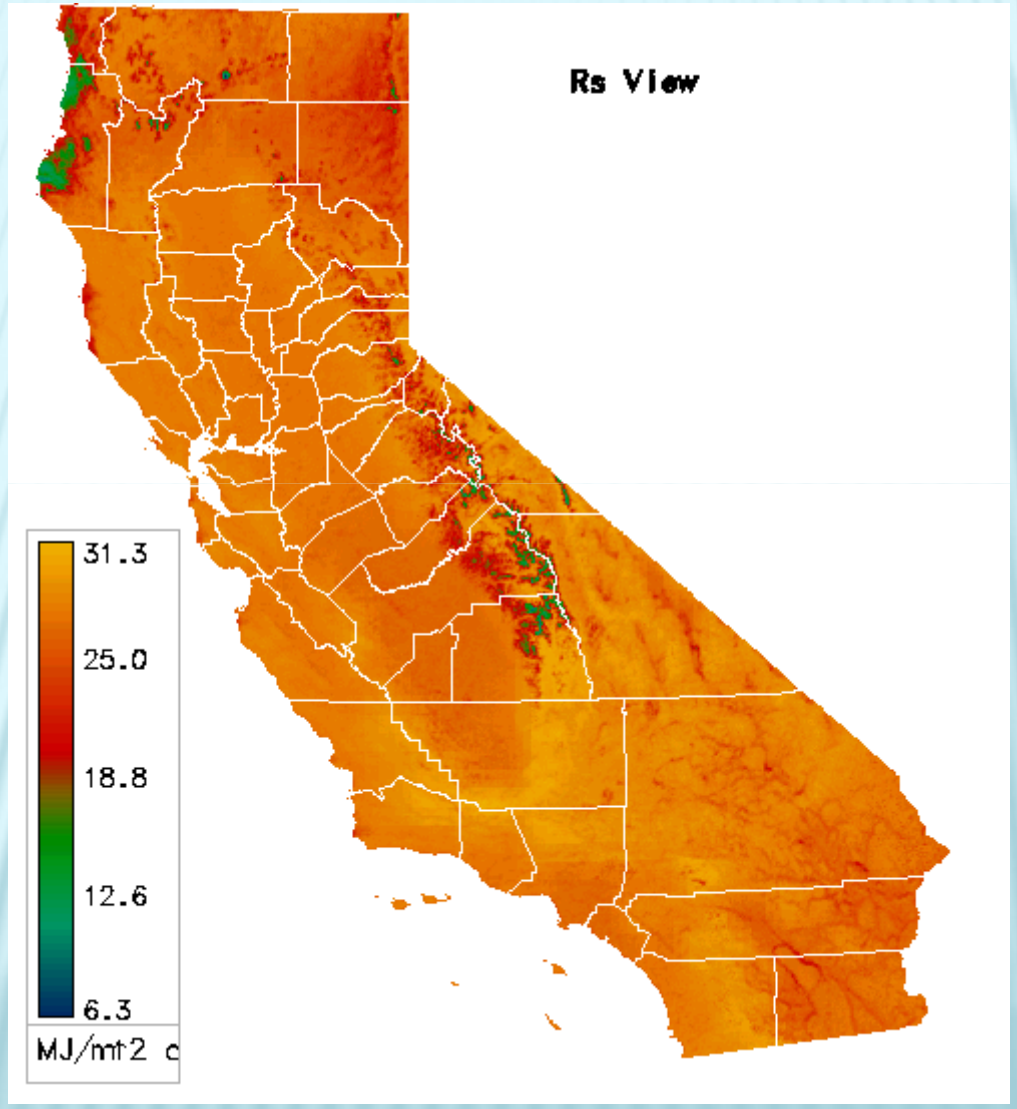


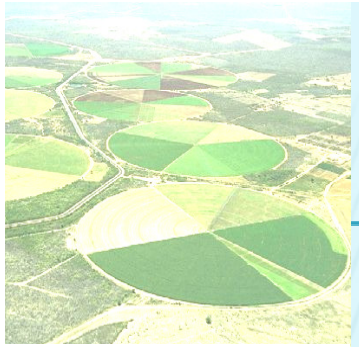
- ETo é calculada usando a equação de Penman-Monteith

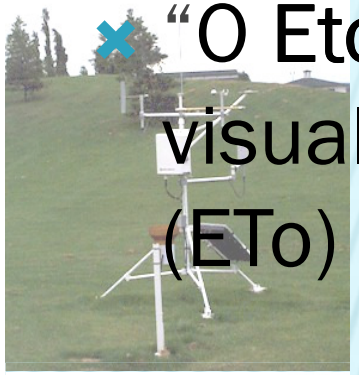

ETO View
9.4
7.5
5.7
3.8
2.0
mm



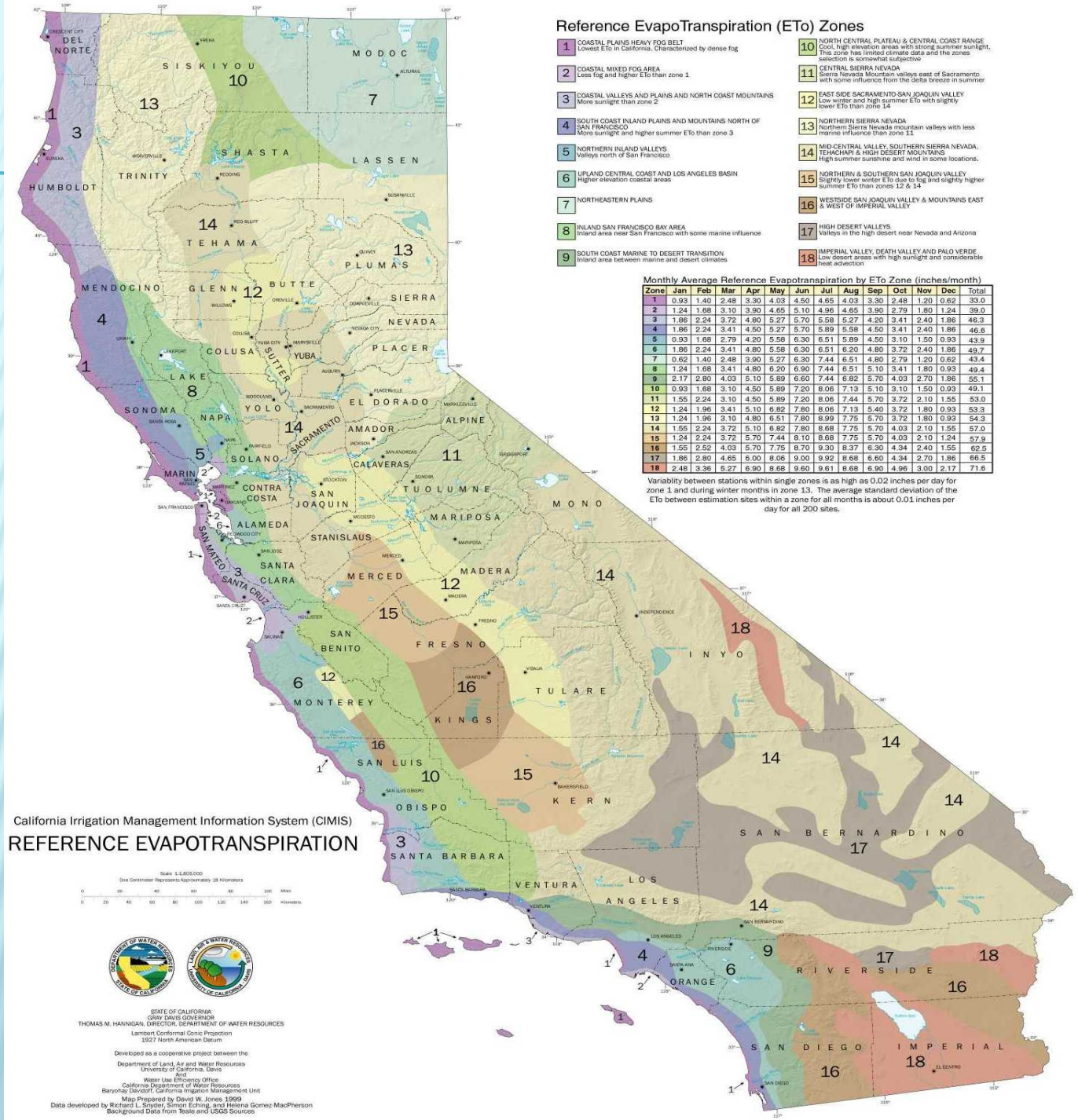
- O mapa diário de radiação solar (Rs) é gerado utilizando dados de sensoriamento remoto do Ambiente Operacional Geostationary Satellites (GOES), aliada ao modelo HELIOSAT-II, 2 km de resolução espacial


Rs View
31.3
25.0
18.8
12.6
6.3
MJ/mt2 c





- “O Eto Zones Mapa” permite aos usuários visualizarem a evapotranspiração de referência (ETo) para o Estado da Califórnia.



Reference EvapoTranspiration (ETo) Zones

1. COASTAL PLAINS HEAVY FOG BELT
   Lowest ETo in California. Characterized by dense fog
2. COASTAL MIXED FOG AREA
   Less fog and higher ETo than zone 1
3. COASTAL VALLEYS AND PLAINS AND NORTH COAST MOUNTAINS
   More sunlight than zone 2
4. SOUTH COAST INLAND PLAINS AND MOUNTAINS NORTH OF SAN FRANCISCO
   More sunlight and higher summer ETo than zone 3
5. NORTHERN INLAND VALLEYS
   Valleys north of San Francisco
6. UPLAND CENTRAL COAST AND LOS ANGELES BASIN
   Higher elevation coastal areas
7. NORTHEASTERN PLAINS
8. INLAND SAN FRANCISCO BAY AREA
   Inland area near San Francisco with some marine influence
9. SOUTH COAST MARINE TO DESERT TRANSITION
   Inland area between marine and desert climates
10. NORTH CENTRAL PLATEAU & CENTRAL COAST RANGE
    Cool, high elevation areas with strong summer sunlight. This zone has limited climate data and the zones selection is somewhat subjective
11. CENTRAL SIERRA NEVADA
    Sierra Nevada Mountain valleys east of Sacramento with some influence from the delta breeze in summer
12. EAST SIDE SACRAMENTO-SAN JOAQUIN VALLEY
    Low winter and high summer ETo with slightly lower ETo than zone 14
13. NORTHERN SIERRA NEVADA
    Northern Sierra Nevada mountain valleys with less marine influence than zone 11
14. MID-CENTRAL VALLEY, SOUTHERN SIERRA NEVADA, TEHACHAPI & HIGH DESERT MOUNTAINS
    High summer sunshine and wind in some locations.
15. NORTHERN & SOUTHERN SAN JOAQUIN VALLEY
    Slightly lower winter ETo due to fog and slightly higher summer ETo than zones 12 & 14
16. WESTSIDE SAN JOAQUIN VALLEY & MOUNTAINS EAST & WEST OF IMPERIAL VALLEY
17. HIGH DESERT VALLEYS
    Valleys in the high desert near Nevada and Arizona
18. IMPERIAL VALLEY, DEATH VALLEY AND PALO VERDE
    Low desert areas with high sunlight and considerable heat advection

Monthly Average Reference Evapotranspiration by ETo Zone (inches/month)

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	0.93	1.40	2.48	3.30	4.03	4.50	4.65	4.03	3.30	2.48	1.20	0.62	33.0
2	1.24	1.68	3.10	3.90	4.65	5.10	4.96	4.65	3.90	2.79	1.80	1.24	39.0
3	1.86	2.24	3.72	4.80	5.27	5.70	5.58	5.27	4.20	3.41	2.40	1.86	46.3
4	1.86	2.24	3.41	4.50	5.27	5.70	5.89	5.58	4.50	3.41	2.40	1.86	46.6
5	0.93	1.68	2.79	4.20	5.58	6.30	6.51	5.89	4.50	3.10	1.50	0.93	43.9
6	1.86	2.24	3.41	4.80	5.58	6.30	6.51	6.20	4.80	3.72	2.40	1.86	49.7
7	0.62	1.40	2.48	3.90	5.27	6.30	7.44	6.51	4.80	2.79	1.20	0.62	43.4
8	1.24	1.68	3.41	4.80	6.20	6.90	7.44	6.51	5.10	3.41	1.80	0.93	49.4
9	2.17	2.80	4.03	5.10	5.89	6.60	7.44	6.82	5.70	4.03	2.70	1.86	55.1
10	0.93	1.68	3.10	4.50	5.89	7.20	8.06	7.13	5.10	3.10	1.50	0.93	49.1
11	1.55	2.24	3.10	4.50	5.89	7.20	8.06	7.44	5.70	3.72	2.10	1.55	53.0
12	1.24	1.96	3.41	5.10	6.82	7.80	8.06	7.13	5.40	3.72	1.80	0.93	53.3
13	1.24	1.96	3.10	4.80	6.51	7.80	8.99	7.75	5.70	3.72	1.80	0.93	54.3
14	1.55	2.24	3.72	5.10	6.82	7.80	8.68	7.75	5.70	4.03	2.10	1.55	57.0
15	1.24	2.24	3.72	5.70	7.44	8.10	8.68	7.75	5.70	4.03	2.10	1.24	57.9
16	1.55	2.52	4.03	5.70	7.75	8.70	9.30	8.37	6.30	4.34	2.40	1.55	62.5
17	1.86	2.80	4.65	6.00	8.06	9.00	9.92	8.68	6.60	4.34	2.70	1.86	66.5
18	2.48	3.36	5.27	6.90	8.68	9.60	9.61	8.68	6.90	4.96	3.00	2.17	71.6

Variablity between stations within single zones is as high as 0.02 inches per day for zone 1 and during winter months in zone 13. The average standard deviation of the ETo between estimation sites within a zone for all months is about 0.01 inches per day for all 200 sites.

California Irrigation Management Information System (CIMIS)

REFERENCE EVAPOTRANSPIRATION

Scale 1:1,805,000
One Centimeter Represents Approximately 18 Kilometers

STATE OF CALIFORNIA
GRAY DAVIS GOVERNOR
THOMAS M. HANNIGAN, DIRECTOR, DEPARTMENT OF WATER RESOURCES

Lambert Conformal Conic Projection
1927 North American Datum

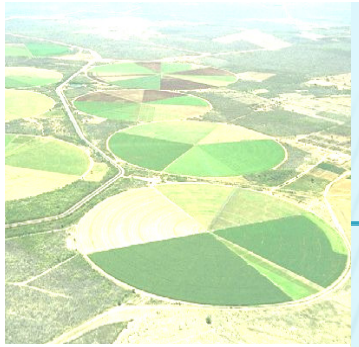
Developed as a cooperative project between the

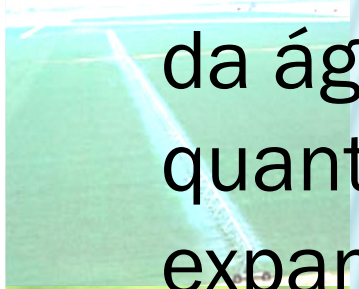
Department of Land, Air and Water Resources
University of California, Davis
and
Water Use Efficiency Office
California Department of Water Resources
Baryohay Davoodi, California Irrigation Management Unit

Map Prepared by David W. Jones 1999
Data developed by Richard L. Snyder, Simon Eching, and Helena Gomez-MacPherson
Background Data from Teale and USGS Sources

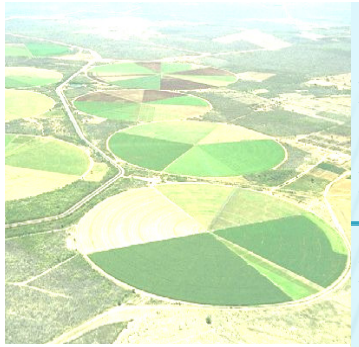
LABORATÓRIOS MÓVEIS

- CIMIS ajuda irrigantes a desenvolver orçamentos da água para determinar quando irrigar e quanta água aplicar.

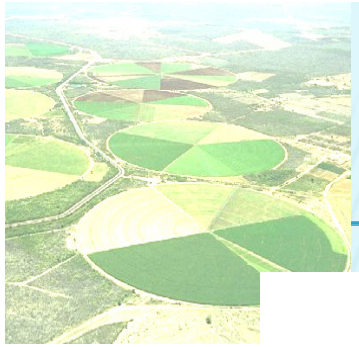




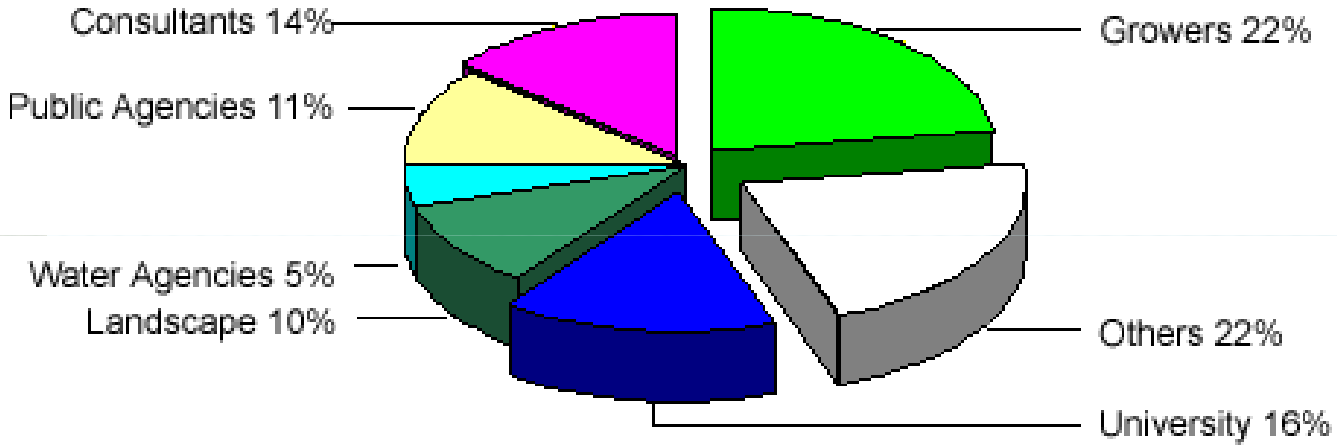
- CIMIS foi inicialmente concebido para ajudar os produtores agrícolas e gerentes de território que administra os parques, campos de golfe e outras paisagens de desenvolver orçamentos da água para determinar quando irrigar e quanta água a aplicar, a base de usuários expandiu-se ao longo dos anos



- agências de água local,
- bombeiros,
- professores ,
- os gerentes de controle de praga,
- pesquisadores das universidades, escolas e estudantes,
- engenheiros,
- consultores,
- hidrólogos,
- agências estaduais e federais,
- os serviços públicos,
- advogados ,
- as agências meteorológicas, e muitos mais.



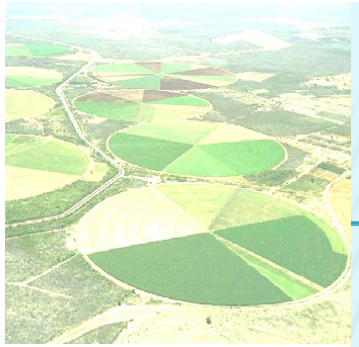
CIMIS Registered User Categories



CONCLUSÃO

- CIMIS ajuda irrigantes desenvolver orçamentos da água para determinar quando irrigar e quanta água aplicar.

- Para se ter uma programação de irrigação eficiente o produtor deve saber o desempenho do sistema de irrigação.



- Iniciativas como esta devem ser seguidas, independente de ajuda governamental ou acesso a tanta tecnologia, principalmente por nós agrônomos, uma vez que teremos informações suficientes para ajudar na conservação deste bem tão precioso.

OBRIGADA!!