

2do Foro de opinión

Diálogo entre jóvenes

*Una visión desde los jóvenes ante los nuevos retos de la gestión integrada de zonas de riego*



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# LA DISPONIBILIDAD DE AGUA Y ENERGÍA EN UN ENTORNO INCIERTO

## Gestión del agua en zonas de riego

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Jueves, 20 de agosto del 2020

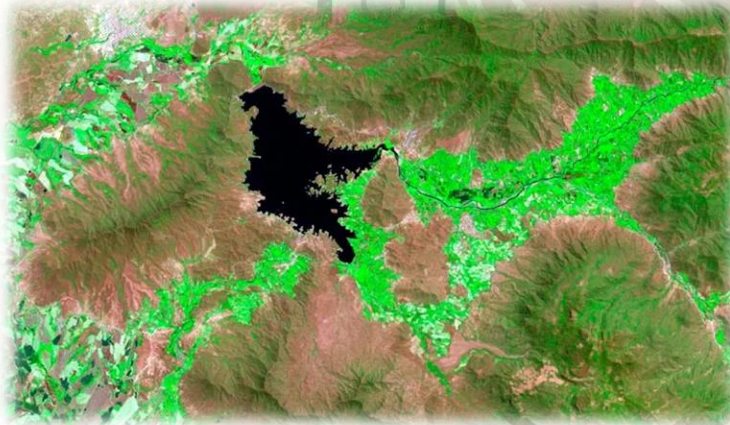




Landsat



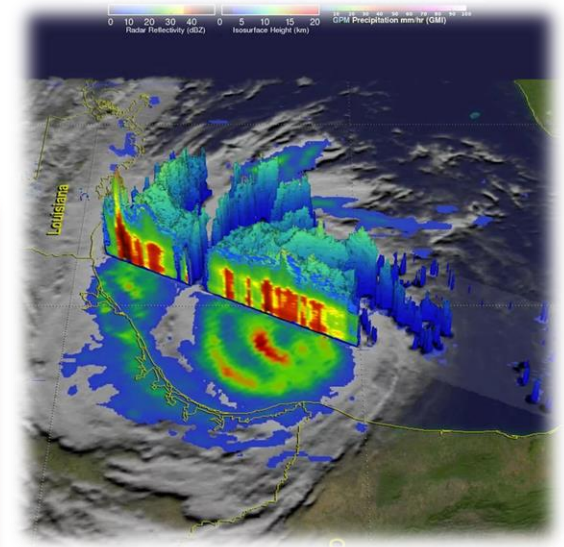
Sentinel



SMAP

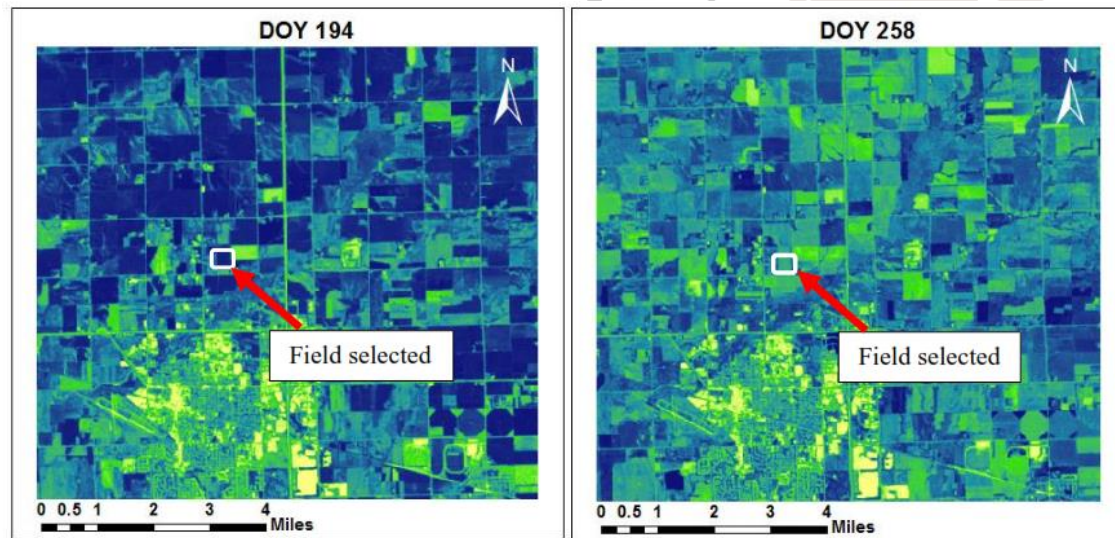
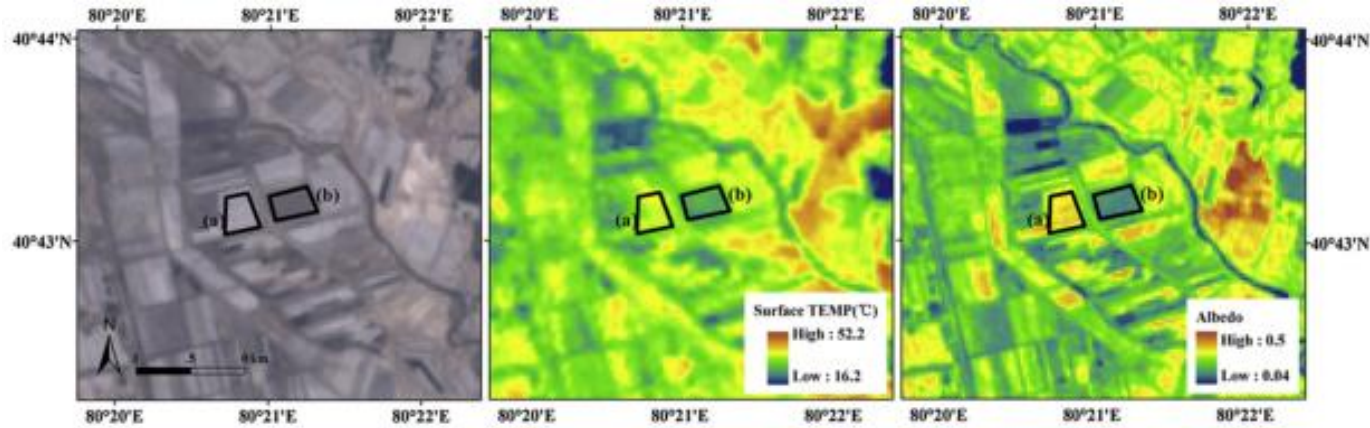


GPM

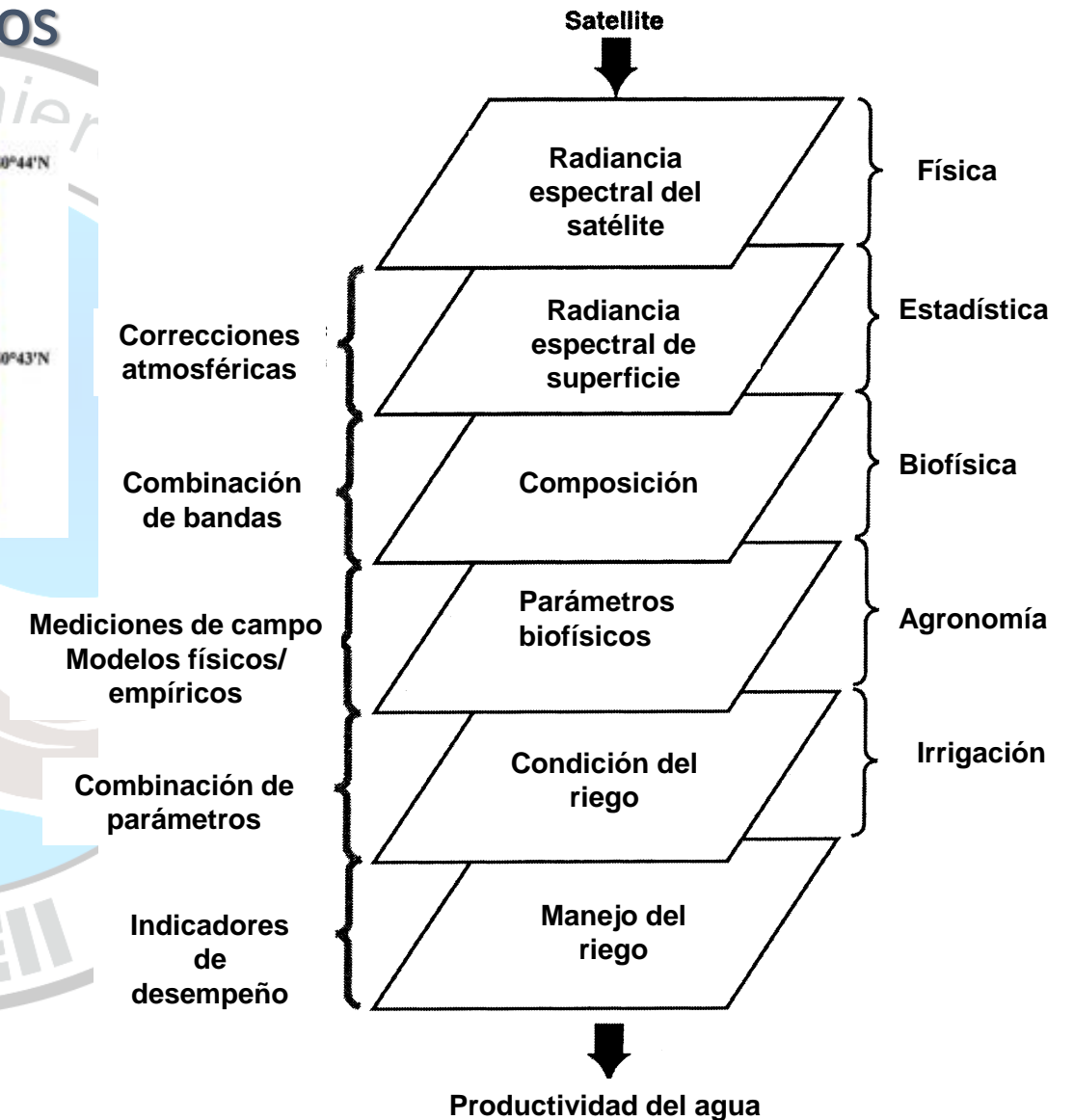




# Gestión del agua con sensores remotos



ETa (mm/d)



# La evapotranspiración

Con la finalidad de mejorar la gestión del agua de riego es necesario calcular la **evapotranspiración** de cultivo de forma más eficiente, por lo tanto es necesario tener estimaciones precisas.

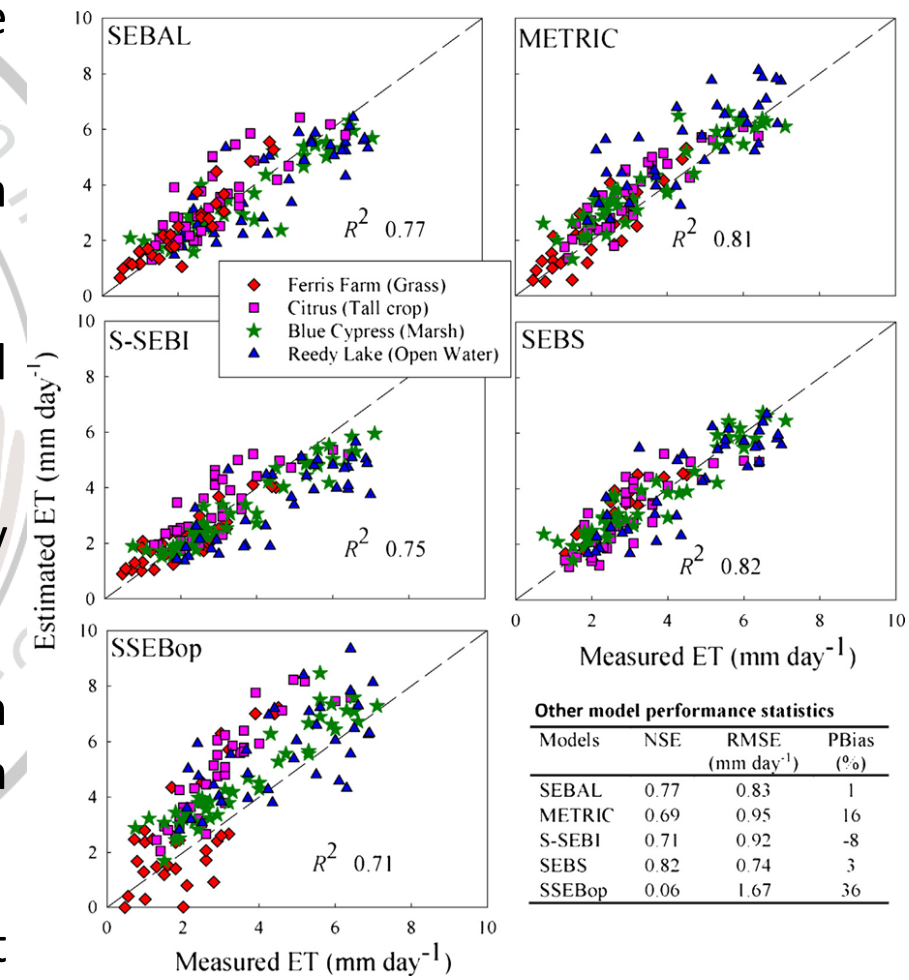
**Balance de energía** y la **radiación neta** son parámetros principales en la mayoría de los métodos para estimar la evapotranspiración con sensores remotos.





# Diferentes métodos de Balance de Energía Superficial

- Índice de Balance de energía superficial- Surface Energy Balance Index (SEBI)(Menenti & Choudhury, 1993).
- Sistema de balance de energía Surface - Energy Balance System (SEBS) (Su,2002).
- Índice de Balance de energía superficial simplificado- Simplified Surface Energy Balance Index (S-SEBI) ( Roerink et al., 2000).
- Algoritmo para el Balance de Energía Superficial -Surface Energy Balance Algorithm for Land (SEBAL) (Bastiaanssen et al., 1998).
- Mapeo de la Evapotranspiración en altas Resolución y con Calibración Internalizada- Mapping Evapotranspiration at High Resolution and with Internalized Calibration (METRIC).
- Modelos de dos fuentes - Two-Source Models (TSM) (Norman et al. 1995).



## Comparaciones de los diferentes modelos para estimar la Evapotranspiración con sensores remotos

Algorithms	Input Parameters	Main assumptions	Merits	Demerits
SEBI	$\langle T \rangle_{pbl}$ , $h_{pbl}$ , $v$ , $T_s$ , $R_n$ , $G$	$(ET)_{dry\ limit} = 0$ ; $(ET)_{wet\ limit} \rightarrow$ evaporates potentially	Relating the effects of $T_s$ and $r_a$ directly on LE	Requires ground based measurements
SEBS	$T_{air}$ , $h_a$ , $v$ , $T_s$ , $R_n$ , $G$	$(ET)_{dry\ limit} = 0$ ; $(ET)_{wet\ limit} \rightarrow$ takes place at a potential rate	Uncertainty in SEBS from $T_s$ and meteorological parameters can partially be solved; Roughness height for heat transfer is computed explicitly instead of using fixed values	Requires too many parameters; Relatively complex derivation of turbulent heat fluxes
S-SEBI	$T_s$ , $\alpha_s$ , $R_n$ , $G$	$(EF)_a = (T_H - T_S)/(T_H - T_{LE})$ $T_H = (LE)_{min}$ $T_{LE} = (LE)_{max}$	Ground based measurements are not required	Extreme temperatures are location specific
SEBAL	$v$ , $h_a$ , $T_s$ , $VI$ , $R_n$ , $G$	$dT = cT_s + d$ $(ET)_{dry\ pixel} = 0$ ; $(ET)_{wet} \rightarrow$ considered as the surface available energy	Requires minimum Ground based measurements; Equipped with automatic internal calibration; Exact atmospheric corrections are not required	Applied over plain surfaces; Possesses uncertainties in the determination of anchor pixels
METRIC	$v$ , $h_a$ , $T_s$ , $VI$ , $R_n$ , $G$	$(ET)_{hot\ pixel} = 0$ $(LE)_{wet\ pixel} = 1.05ET_r$	Similar to SEBAL, but surface slope and aspect can be considered	Possesses uncertainties in the determination of anchor pixels
TSM	$v$ , $h_a$ , $T_{air}$ , $T_s$ , $T_c$ , $F_r$ or $LAI$ , $R_n$ , $G$	(1) Component fluxes are parallel to each other; (2) Priestly-Taylor equation is used to compute canopy transpiration.	(1) Includes the view geometry; (2) Eliminates the need of empirical corrections for the "excess resistance".	(1) Many ground measurements and components are needed.

Abbreviations:  $\langle T \rangle_{pbl}$  = Average planetary boundary layer temperature;  $h_{pbl}$  = Height of the PBL;  $v$  = Wind speed;  $T_s$  = Surface temperature;  $T_c$  = Vegetation canopy temperature;  $R_n$  = Surface net radiation;  $G$  = Soil heat flux density;  $h_a$  = Measurement height of wind speed and air temperature;  $VI$  = Vegetation Index;  $LAI$  = Leaf Area Index;  $F_r$  = Fractional vegetation cover;  $\alpha_s$  = Surface shortwave albedo;  $T_{air}$  = Air temperature measured at a reference height.

*Muchas gracias*



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