

# Quelques exemples d'initiatives de recherche et de sensibilisation



12<sup>th</sup> anniversary



# LE BASSIN DES EAUX USÉES TRAITÉES







## **TRAVAUX DES OUVRAGES DE POST-TRAITEMENT EN COURS**







**CHOIX DES CULTURES À BORJ TOUIL : COTONNIER**







## INSTALLATION DU SYSTÈME D'IRRIGATION ET DE FILTRATION







## LA QUALITÉ DE L'EAU D'IRRIGATION







**AVANT ET APRÈS QUELQUES JOURS – SEMAINES**







## LA QUESTION DE LA QUALITÉ DE L'EAU







## **QUEL SYSTÈME D'IRRIGATION**







## **IRRIGATION DE SURFACE AVEC LES EUT**







## **RAVAGEURS ET TRAITEMENTS PHYTOSANITAIRES !**







## QUELS TRAITEMENTS PHYTOSANITAIRES ?







**STAGE D'ÉTÉ**



# LA QUESTION DE L'OCCUPATION DU SOL ET DE L'IRRIGATION





# Land Use Land Cover Mapping of Borj Touil (Northern Tunisia) Irrigated District with Redaimed Water Using Landsat-8 and Sentinel-2 Satellite Images

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## Keywords

Remote sensing • Supervised classification • Decision tree • Water requirement  
Landsat 8 • Sentinel 2

## 1 Introduction

Remote sensing is a reliable technique to quantify and qualify the detected objects and thus to inform on the extension and the identification of the agricultural areas. The main objectives of this study were (i) to map the land use/land cover (LULC) of 2015/2016 agricultural campaign of Borj Touil's irrigated district with reclaimed water, using Landsat-8 and Sentinel-2 images and (ii) to evaluate and map the potential annual water requirement of the irrigated perimeter using the CROPWAT 3.0 model.

## 2 Materials and Methods

To determine the LULC of the agricultural area, twelve Landsat-8 images and nine Sentinel-2 images were freely downloaded and then corrected atmospherically using 3SIS method. A fieldwork was conducted during August 2016 and the LULC of randomly selected samples representing 5% of the total study area were identified. Two LULC maps were obtained: a winter map and a summer map. To obtain

the LULC of the winter period more than 50 bands combinations were set up, varying images type, date and number and including NDVI in some of them. For each combination, a supervised classification was processed applying the Maximum Likelihood Algorithm, which is the most common method used in remote sensing for image data analysis (Richard 1995). The results were then evaluated using kappa index. For the summer land use a decision tree method based on a set of NDVI thresholds was applied in order to delineate the irrigated land. The used NDVI threshold (0.5) was obtained from the generated NDVI profiles analysis of the Landsat images of June, July and August. Then 23 supervised classifications using the Maximum Likelihood were performed. The best resulting LULC map considered was the one that has the highest kappa index and maintains all the land classes observed in the sampled area. On the base of the best LULC map, the potential annual water requirements map was obtained. The potential annual water requirement for each crop was calculated using CROPWAT 3.0 model using the meteorological parameters (IAC, WEIN). The reference evapotranspiration (ETo) was calculated by FAO Penman-Monteith method then multiplied by an empirical crop coefficient (Kc) to produce an estimate of crop evapotranspiration (ETc).

## 3 Results and Discussion

### 3.1 Classification

The best classification selected to map the winter LULC has Kappa index of 0.91 (Fig. 1a). Six images were used (October 5, March 20, June 17, February 6, April 26 and

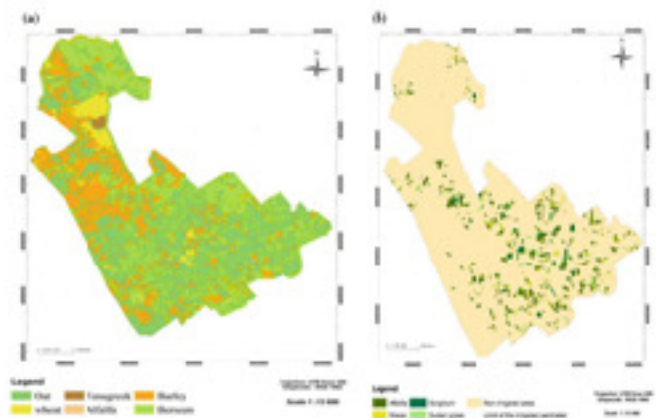


Fig. 1 Land use/land cover of Borj Touil irrigated district with reclaimed water of a winter crops and b summer crops

May 27). The last three dates correspond to Landsat images and the last three are Sentinel's. The crops cultivated in the winter are: On, Barsoom, Barley, Wheat, Alfalfa and Panspek with area covering respectively, 1819, 1308, 1022, 160 and 15 ha. The best classification selected to map the summer LULC has Kappa index of 0.86 (Fig. 1b). The images used are June 5, July 19 and August 20. The crops cultivated in the summer are: ARMS, Maize, Sorghum and Sudan grass with an area covering respectively, 234, 66, 39 and 35 ha. The irrigated area occupies 8.0% of the total agricultural area.

### 3.2 Water Requirement Assessment

The values of the potential annual water requirement provided by the CROPWAT 3.0 model based on the FAO56 approach shows that the total required amount of water to meet the needs of all the winter crops during 2015/2016 is 5.56 mm<sup>3</sup> and of all the summer crops is 2.22 mm<sup>3</sup>. The alfalfa had the highest water requirements whereas the barley had the lowest. Figure 2 presents the potential annual water requirement map of the study area of (a) winter crops and (b) summer crops.

Land Use Land Cover Mapping of Borj Touil Irrigated District

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Fig. 2 The potential annual water requirement map of a winter crops and b summer crops

## 4 Conclusion

The maximum likelihood classification using Landsat-8 and Sentinel-2 images supply an accurate map of LULC of the Borj Touil's irrigated area with reclaimed water. The best winter LULC map was obtained using six multi-temporal images and the best summer LULC map using three images. Based on the LULC maps and CROPWAT model, during 2015/2016 the total required amount of water to meet the needs of all the winter crops in Borj Touil irrigated area is 5.56 mm<sup>3</sup> and it is

2.22 mm<sup>3</sup> for all the summer crops. The alfalfa has the highest water requirements and the barley the lowest.

## References

FAO. CropsWat 3.0 for windows user guide. Rome, July, 2008. [www.fao.org](http://www.fao.org)  
Richard, J.A. Remote Sensing: Digital Image Analysis in Introduction. Springer-Verlag, 1995.



# La Lettre

Wallonie-Bruxelles en Tunisie



## Nouvelle programmation de coopération bilatérale 2016-2018

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# COM' SCI

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Sous-Directrice générale de L'UNESCO

**ABDELGHANI CHEHBOUNI**

Directeur de Recherche IRD, Maroc

**CHRISTIAN LEDUC**

Directeur de Recherche IRD, Montpellier

**KARIM ERGAIEG**

Chercheur à INAT

**JEUDI 18 MAI 2017 / 16H30 > 19H**

Auditorium de L'Institut français de Tunisie

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COP 22, MARRAKECH  
2016



CMI, MARSEILLE  
2017



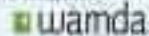


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**INNOVATION DES JEUNES AVEC LES EAUX USÉES**





**BAYA AISSAOUI**

**VALORIZATION OF TREATED WASTEWATER BY AQUAPONY  
PREMIER PRIX D'INNOVATION 22 MARS 2017,  
MARSEILLE**





**YOUTH INNOVATING WITH WASTEWATER FOR A SUSTAINABLE  
MEDITERRANEAN  
WASTEWATER REUSE – MARS 2017, MARSEILLE**





## PLATEFORME D'ÉCHANGE ET D'INSPIRATION POUR LES JEUNES







## AMÉNAGEMENT DE PARCELLES DE ROSIER ET DE GÉRANIUM







**TRAVAIL D'ÉQUIPE GDA SIDI AMOR – INAT À BORJ TOUIL**







**LA ROSE DELIRAN, DE LA VILLE AUX TERRITOIRES**

**MANIFESTATION**

À l'occasion de la plantation des plants, nous allons avoir un grand potentiel de collaboration avec les différents acteurs de l'équipement agricole, les associations, les entreprises, les collectivités locales, les médias, les universités et les citoyens. Nous espérons ainsi constituer un réseau de personnes impliquées dans la promotion de la rose de l'Ariana.

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**ATELIER 1**  
**HERITAGE ET PRODUITS**  
 - Les roses prénées du COOLIARES (1917-1927) et du TOUF PUBLIC (1927-1937)  
**ATELIER 2**  
**ESTIMATION ET PRODUITS**  
 - Les roses prénées du COOLIARES (1917-1927) et du TOUF PUBLIC (1927-1937)  
**ATELIER 3**  
**PRODUITS ET PRODUITS**  
 - Les roses prénées du COOLIARES (1917-1927) et du TOUF PUBLIC (1927-1937)  
**ATELIER 4**  
**PRODUITS ET PRODUITS**  
 - Les roses prénées du COOLIARES (1917-1927) et du TOUF PUBLIC (1927-1937)

**LA ROSE DE L'ARIANA**  
 DE LA VILLE AUX TERRITOIRES

**Journées scientifiques**

Le 23 Mai 2017 (jeudi) 14h-18h  
 LE 24 Mai à l'INSTITUT NATIONAL AGRICOLE DE TUNISIE

**916 60470302 84 741610**







## **MONITORING DE LA PARCELLE DE GÉRANIUM À BORJ TOUIL**







**DISTILLATION DU GÉRANIUM DE BORJ TOUIL AU GDA SIDI AMOR**







## PLATEFORME D'ÉCHANGE ET D'APPRENTISSAGE







## **ADMINISTRATION – FORMATION**



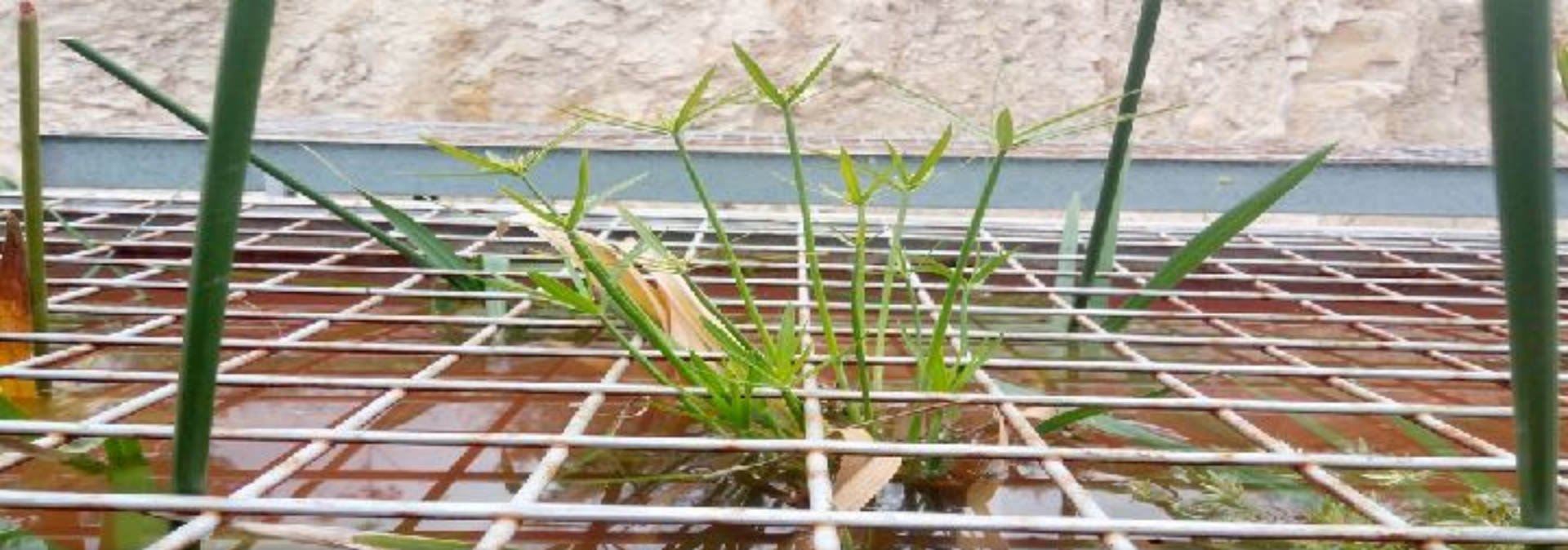




## GDA SIDI AMOR – PPI BORJ TOUIL







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# NATURE- BASED SOLUTION FOR WATER AND CLIMATE CHANGE

## ADAPTATION IN MEDITERRANEAN AREA – EGYPT 2018







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## **FÊTE DE L'ARBRE 2017**





# ÉDUCATION ÉCOLOGIQUE DES SCOLAIRES 2018





**MERCI POUR VOTRE ATTENTION**

