



Democratic and Popular Republic of Algeria
Ministry of Higher Education and Scientific Research
Ziane Achour-Djelfa University
Faculty of Natural and Life Sciences



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |



PROCEEDINGS OF THE ABSTRACTS

November 18-21, 2024

University of Djelfa, Djelfa, Algeria

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

The Earth and Universe Sciences Department of the Ziane Achour Univ. Djelfa (Algeria), the Steppic Vegetation Ecology Laboratory (EVS), and the UR Spheres of the Univ. Liège (Belgium), with support from the General Directorate for Scientific Research and Technological Development (DGRSTD), are organizing an international conference on "**Land Degradation and Sustainable Development in the Steppes**" from November 18 to 22, 2024. This conference is organized under the patronage of the International Geographical Union Commissions "Land Degradation and Desertification" (COMLAND) and of "Sustainable Rural Systems" (CSRS).



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Honorary Chairs

- Pr. El Hadj Ailam, Rector of Ziane Achour University, Algeria
- Dr. Abdelghani Elmahdaoui Rebhi, Dean of SNV Faculty, Algeria
- Pr. Mokhtar Boualem Lahrech, President of the Scientific Council of the Faculty
- Dr. Mokhtar Bouabdelli, High Commission for the Development of the Steppes

General Chairs

- Dr. Belgacem Tahchi, Conference Chair, Univ. Djelfa, |Algeria|
- Pr. Schmitz Serge, Conference Co-chair, Univ. Liège, CSRS, |Belgium|
- Pr. Karim Souttou, Conference Co-chair, EVES Laboratory, |Algeria|

Scientific Chairs

- Dr. Farid Djeddaoui, Scientific Committee Chair, Univ. Djelfa, |Algeria|
- Pr. Ozer Pierre, Scientific Committee Chair, Univ. Liège, |Belgium|
- Dr. Matija Zorn, Scientific Committee Chair, COMLAND, ZRC SAZU, |Slovenia|

Scientific Committee Members

- Dr. Farid Djeddaoui, Univ. Djelfa, |Algeria|
- Dr. Belgacem Tahchi, Univ. Djelfa, |Algeria|
- Pr. Ozer Pierre, Univ. Liège, |Belgium|
- Dr. Matija Zorn, ZRC SAZU, |Slovenia|
- Pr. Schmitz Serge, Univ. Liège, |Belgium|
- Pr. Karim Souttou, Univ. Djelfa, |Algeria|
- Dr. Adel Boussaid, Univ. Djelfa, |Algeria|
- Pr. Safia Belhadj, Univ. Djelfa, |Algeria|
- Dr. Imtinen Ben Haj Jilani, Univ. Carthage, |Tunisia|
- Dr. Benyahia Kaouther, INRGREF, |Tunisia|
- Pr. Nadjib Haied, Univ. Djelfa, |Algeria|
- Dr. Atif Foufou, Univ. Djelfa, |Algeria|
- Pr. Bilel Azouzi, Univ. Djelfa, |Algeria|
- Dr. Bachar Keira, Univ. Djelfa, |Algeria|
- Dr. Fares Trodi, Univ. Djelfa, |Algeria|
- Dr. Samira Dib, Univ. Djelfa, |Algeria|
- Dr. Khaled Khodja Yazid, Univ. Djelfa, |Algeria|
- Dr. Mustapha Touati, Univ. Djelfa, |Algeria|
- Pr. Joaquim Farguell, Univ. Barcelona, |Spain|
- Pr. Bouzid Nedjimi, Univ. Djelfa, |Algeria|
- Pr. Brahim Guit, Univ. Djelfa, |Algeria|
- Dr. Habib Mouissa, Univ. Djelfa, |Algeria|
- Dr. Mohamed Khader, Univ. Djelfa, |Algeria|
- Dr. Mohamed Hachi, Univ. Djelfa, |Algeria|
- Dr. Mohamed Hamidi, Univ. Djelfa, |Algeria|
- Dr. Zohir Bouleknafet, Univ. Djelfa, |Algeria|
- Dr. Boubakeur Guesmi, Univ. Djelfa, |Algeria|
- Dr. Mohamed Azlaoui, Univ. Djelfa, |Algeria|
- Dr. Benziane Adli, Univ. Djelfa, |Algeria|
- Pr. Mahfoud Ziane, USTHB, |Algeria|
- Pr. Scherazad Mekious, Univ. Djelfa, |Algeria|
- Pr. Omar Elahcene, Univ. Djelfa, |Algeria|
- Dr. Fatah Bouteldjaoui, Univ. Djelfa, |Algeria|
- Dr. Imad eddine Bouznad, Univ. Guelma, |Algeria|
- Dr. Karima Bencherif, Univ. Djelfa, |Algeria|
- Dr. Rachida Kerzabi, CRAPast, |Algeria|
- Dr. Brahim Taibaoui, Univ. Djelfa, |Algeria|
- Dr. Said Slimani, Univ. Tizi Ouzou, |Algeria|
- Dr. Mohamed Azouz, Univ. Djelfa, |Algeria|
- Dr. Saleh Karef, Univ. Djelfa, |Algeria|
- Dr. Boudjemaa Sehl, Univ. Djelfa, |Algeria|
- Dr. Abdelaziz M. Guendouz, Univ. Djelfa, |Algeria|
- Pr. Carlo Prével, UQAT, |Canada|
- Pr. Boutaiba Saad, Univ. Djelfa, |Algeria|
- Pr. Guerzou Ahlem, Univ. Djelfa, |Algeria|
- Dr. Mostefaoui Abdellah, Univ. Djelfa, |Algeria|
- Dr. Ahmed Keddouri, Univ. Djelfa, |Algeria|

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Scientific Committee Members

- Dr. Tayeb Tichoudad, Univ. Djelfa, |Algeria|
- Dr. Rebhi Abdelghani Elmahdaoui, Univ. Djelfa, |Algeria|
- Dr. Andrea Vacca, Univ. Cagliari, |Italy|
- Pr. Ahcène Hakem, CRAPast, |Algeria|
- Pr. Abdassamed Mohamed Razaz, USTHB, |Algeria|
- Dr. Obaid Ahmed K., Univ. Durham, |UK|
- Dr. Arsalan Ahmed Othman, Komar Univ. Science and Technology, |Iraq|
- Pr. Benalia Yabrir, Univ. Djelfa, |Algeria|
- Pr. Ismail Dabanli, Istanbul Technical University, |Turkey|
- Pr. José Damian Ruiz Sinoga, Univ. Málaga, |Spain|
- Pr. Jean Louis Morel, Univ. Lorraine, |France|
- Pr. Dalila Kherchouche, Université de Batna, |Algeria|
- Pr. Maria Teresa Camacho Olmedo, Univ. Granada, |Spain|
- Pr. Fathi Belhouadjeb, CRAPast, |Algeria|
- Pr. Mohamed Chadli, USTHB, |Algeria|
- Pr. Mostefa Dahia, Univ. Djelfa, |Algeria|
- Pr. Souiher Nouari, USTHB, |Algeria|
- Pr. Arezki Derridj, Univ. Tizi Ouzou, |Algeria|
- Pr. Mohamed Said Guettouche, USTHB, |Algeria|
- Dr. Aziz Benhamrouche, Constantine-1 University, |Algeria|
- Dr. Hoceme Degaïchia, CRAPast, |Algeria|
- Dr. Mohamed Alouat, ENSB, |Algeria|
- Dr. Mohamed Lahouel, Univ. Djelfa, |Algeria|
- Dr. Rachid Omrani, Univ. Djelfa, |Algeria|
- Dr. Badereddine Rabhi, Univ. Djelfa, |Algeria|
- Dr. Sara Hezil, CRAPast, |Algeria|
- Dr. Zahra Robâ Bouabdelli, CRAPast, |Algeria|
- Dr. Abdelghafour Doghbage, CRAPast, |Algeria|
- Dr. Nadia Bouragba, INRF, |Algeria|

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Organizing Chairs

- Dr. Adel Boussaid, Organizing Committee Chair, Univ. Djelfa, |Algeria|
- Dr. Atif Foufou, Organizing Committee Co-chair, Univ. Djelfa, |Algeria|

Organizing Committee Members

- Mr. Abdelkrim Rahmoun, University of Djelfa
- Mr. Abdellah Sellam, Centre universitaire
- Mr. Abdenour Lakhdari, University of Djelfa
- Mr. Ahmed Hazerchi, CNDRB, Djelfa
- Ms. Aicha Zaoui, University of Djelfa
- Mr. Allal Hanichi, Djelfa forest administration
- Ms. Amel Sassoui, University of Djelfa
- Mr. Andelhafid Guehguih, University of Djelfa
- Mr. Azzouz Mohamed, University of Djelfa
- Mr. Bachir Bakria, University of Djelfa
- Mr. Bendouad Tenah, University of Djelfa
- Mr. Boudjemaa Djaballah, University of Djelfa
- Mr. Boukhnifer Slami, HCDS, Djelfa
- Mr. Djamal Dahmane, University of Djelfa
- Ms. Djamila Bouchiki, University of Djelfa
- Ms. Fatima Guendouz, University of Djelfa
- Ms. Fatma Messaoudene, University of Djelfa
- Dr. Hassiba Ghezal, Djelfa forest administration
- Ms. Ilhem Ferdes, University of Djelfa
- Mr. Ismail Guibech, University of Djelfa
- Mr. Karim Ouachek, University of Djelfa
- Ms. Khadidja Bediaf, University of Djelfa
- Mr. Malek Reda Kerdel, University of Djelfa
- Ms. Meriem Ghazi, University of Djelfa
- Mr. Mohamed El Hassanine Kassimi, University of Djelfa
- Mr. Mohamed Salem Orabi, University of Djelfa
- Ms. Naima Belkheir, University of Djelfa
- Ms. Ourida Chebbah, University of Djelfa
- Mr. Owen Graham, COMLAND
- Mr. Rabhi Badreddine, University of Djelfa
- Ms. Randa Boussaid, CRAPast, Djelfa
- Mr. Saad Chinoun, University of Djelfa
- Ms. Saliha Barkani, University of Djelfa
- Ms. Samiha Hebali, University of Djelfa
- Ms. Siham Rekia Yahiaoui, University of Djelfa
- Mr. Toufik Tayeb Naas, University of Djelfa
- Mr. Amar Benkhelef, University of Djelfa
- Ms. Medouni Amina, University of Djelfa



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

FOREWORD

Being a very interesting field of study for geography through its different branches, steppe regions are particularly vulnerable and require special interest. This international conference proposes to investigate their particularities compared to other biotopes and to point out common statements through an international comparison. The event is also an opportunity to know more about the Algerian steppes and its environmental challenges similar to those of the rest of the world. Soil degradation, drought, overgrazing, and a lack of protective legislative framework are among the causes of such disasters. With its diverse landscapes of forests, dunes, sebkhas, chotts, vast plains, and mountain formations, the Djelfa region exemplifies the landscape, climatic, and biological diversity of the Algerian steppe.

With its multiple sessions, the international conference on "Land Degradation and Sustainable Development in the Steppe" serves as a tool within a lengthy process that combines theory with experimentation, drawing on a broad cohort of scientists from various disciplines to enrich and construct initial responses for an ecosystem in danger and lands at high risk of degradation.

Now open, the call for papers for a four-day conference featuring two days of communications and two days of field work. This conference is the inaugural scientific event of its kind, aimed at the collaborative observation and monitoring of the steppe ecosystem, organized and supervised by geographers from diverse backgrounds.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Technical Program V3

Monday, 18 November

Algeria Time (UTC +1)/ Central European Time (UTC +1)/ Middle East Time (UTC +3)

07:30 - 08:30	Registration	Auditorium Entrance
08:30 - 10:00	Opening Ceremony	Auditorium
10:00 - 10:30	Poster Session A	Poster Session Chair: Mr.Souttou Karim Poster Area (First floor) coffee break Page
Session 1, THEME 07		
Moderator: Mr. Schmitz Serge Rapporteur: Mr. Boussaid Adel		
10:30 - 10:50	Keynote Lecture: Mr. Schmitz Serge , <i>Why should we talk of steppification?</i>	
10:50 - 11:00	OP1: Mr. Breg Valjavec , <i>The role of dolines in climate change mitigation in the Mediterranean karst landscape</i>	7
11:00 - 11:10	OP2: Mr. Bouznad Imad Eddine , <i>Modelisation RUSLE/AHP soil erosion analysis in the Algerian High Plateaus: the impact of climate change and drought through RUSLE/AHP modelling and remote sensing.</i>	8
11:10 - 11:20	OP3: Mr. Djelaila Yassine , <i>Climatic characterisation of the Wilaya of El Bayadh.</i>	9
11:20 - 11:30	OP4: Mrs. Karima Bencherif , <i>Arbuscular mycorrhizal fungi mitigate negative effects of climate change in steppe ecosystems.</i>	10
11:30 - 11:40	OP5: Ms. Sara Hezil , <i>Phenology monitoring: PPM a biological model for climate change.</i>	11
11:40 - 12:10	Debate	
12:10 - 13:30	Lunch	Adjacent building
Session 2 THEME 06		
Moderator: Mr. Matija Zorn Rapporteur: Mr. Tahchi Belgacem		
13:30 - 13:50	Keynote Lecture: Mr. Matija Zorn , <i>Low-income countries and the impact of natural disasters</i>	
13:50 - 14:00	OP1: Mr. Oloumane nino Patrick , <i>Applying joint species distribution modelling to understand the relative influence of each ecological filter in the El Bayadh steppe community assembly.</i>	12
14:00 - 14:10	OP2: Ms. Amina Hamadi , <i>Agroforestry potential impacts on agricultural land fertility of foothills North-West of Dahra (Mostaganem, Algeria).</i>	13
14:10 - 14:20	OP3: Ms. Hamida Mallem , <i>Land degradation and vegetation restoration techniques. (Virtual)</i>	14
14:20 - 15:00	Debate	
15:00 - 15:30	Poster Session A	Poster Session Chair: Mr.Souttou Karim Poster Area (First floor) coffee break
Session 3 THEME 06		
Moderator: Mrs. Benyahia Kaouther Rapporteur: Mrs. Belhadj Safia		
15:30 - 15:40	OP1: Mr. Kakha Nadiradze , <i>Soils Microbiota Biodiversity and Conservation. (Virtual)</i>	15
15:40 - 15:50	OP2: Mrs. Mériem Marfoua , <i>Improving seed germination of native species for Algerian Saharan rangeland restoration: effects of cold stratification.</i>	16
15:50 - 16:00	OP3: Ms. Fatima Zohra Batana , <i>Environmental impact of chromium emissions from the Djelfa tannery. (Virtual)</i>	17
16:00 - 16:10	OP4: Ms. Ganaoui Nawel , <i>Restoration strategies for degraded Algerian steppe: insights from comparative vegetation analysis in Mhaka region.</i>	18
16:10 - 16:40	Debate	

Tuesday, 19 November

Algeria Time (UTC +1)/ Central European Time (UTC +1)/ Middle East Time (UTC +3)

Session 4 Diverse Perspectives (THEMES: 4,5,9 and 14)

Moderator: Mr. Pierre Ozer Rapporteur: Mr. Foufou Atif

08:30 - 08:50	Keynote Lecture : Mr. Pierre Ozer , <i>Les steppes</i>	
08:50 - 09:00	OP1: Mrs. Keira Bachar , <i>Taking account of fighting land degradation in urban planning in steppe environment: a prospective inventory.</i>	19
09:00 - 09:10	OP2: Mr. Benyahia Mohammed Elseddik , <i>Biophysiological effects of Atriplex canescens introduction on degraded rangeland vegetation in a semi-arid climate.</i>	20
09:10 - 09:20	OP3: Mr. Gasmi Bensalah , <i>A sustainable integrated approach to the use of the semi-arid Algerian steppe forests soils and regulation of socioecological risk factors through regulatory rural management.</i>	21
09:20 - 09:30	OP4: Mrs. Gares Maroua , <i>The environmental advantages of the cultivation of Algerian alfa as an energy crop for bioenergie production. (Virtual)</i>	22
09:30 - 09:40	OP5: Mrs. Nabila Berrighi , <i>Impact of incorporation of 40% brewer's grain spent on serum parameters and fatty acids profile of Taadmite sheep meat. (Virtual)</i>	24
09:40 - 10:00	Debate	

10:00 - 10:30	Poster Session C Poster Session Chair: Mr. Guit Brahim Poster Area (First floor) coffee break
---------------	--

Session 5 THEME 11

Moderator: Mr. Djeddaoui Farid Rapporteur: Mr. Bouznad Imad Eddine

10:30 - 10:50	Keynote Lecture: Mr. Arsalan Ahmed Othman , <i>Satellite-Derived Shallow Water Depths Estimation Using Remote Sensing and Artificial Intelligence Models in Semi-Arid Region (Iraq). (Virtual)</i>	
10:50 - 11:00	OP1: Mr. Taibaoui Brahim , <i>Contribution of satellite images in monitoring the dynamics of degradation phenomena in steppe ecosystems, case of Djelfa region, Algeria.</i>	25
11:00 - 11:10	OP2: Mr. Abdelhaid Bouzekri , <i>Assessment and Mapping of Desertification Sensitivity in Khenchela Province: Integrating GIS and AHP Methodology.</i>	26
11:10 - 11:20	OP3: Mr. Zegrar Ahmed , <i>The spatial tool in determining the impacts of climate change on the pastoral area of Algeria "case of El Bayadh".</i>	27
11:20 - 11:50	Debate	

11:50 - 13:30	Lunch Adjacent building
---------------	--

Session 6 THEME 08

Moderator: Mr. Tahchi Belgacem Rapporteur: Mr. Elahcene Omar

13:30 - 13:50	Keynote Lecture: Mr. Mohammed Smail : <i>Plants adapted to climate change in arid and semi-arid regions</i>	
13:50 - 14:00	OP1: Mr. Omar Elahcene , <i>Specific degradation in a Mediterranean stream:case of Oued Zeddine.</i>	28
14:00 - 14:10	OP2: Ms. Bouherama Amina , <i>Enhancing plant growth and soil moisture with biopolymeric encapsulation of plant growth promoting bacteria from arid-adapted Medicago sativa.</i>	29
14:10 - 14:20	OP3: Mrs. Assia Meziani , <i>Comparative performance of generalized regression neural network and adaptive neuro-fuzzy inference system models for evapotranspiration estimation in Djelfa. (Virtual)</i>	30
14:20 - 14:30	OP4: Mr. Ahmed Saidani , <i>Estimating of water demand in semi-arid regions, a case study Djelfa city, what are future scenarios?</i>	31
14:30 - 15:00	Debate	

15:00 - 15:30	Poster Session C Poster Session Chair: Mr. Guit Brahim Poster Area (First floor) coffee break
---------------	--

Session 7 Virtual Poster Flash Talks

Moderator: Mr. Guesmi Boubakeur Rapporteur: Mr. Sehl Boudjemaa

15:30 - 15:35	VP1: Ms. Najmeh Daryaei , <i>Approaches to the development of local community resilience along with the sustainable conservation of wetlands: lessons learned from Iran.</i>	32
15:35 - 15:40	VP2: Mr. Kakha Nadiradze , <i>Combating desertification gaining the multi benefits.</i>	33
15:40 - 15:45	VP3: Mr. Deeb Abdelghafour , <i>Development options of water resources in Palestine.</i>	34
15:45 - 15:50	VP4: Mr. Cheikh Bergane , <i>Study of rainfall trends and drought: case of a watershed in eastern Algeria.</i>	35
15:50 - 15:55	VP5: Ms. Hantache Rabhia , <i>Contribution to the study of the toxic effect of organophosphorus pesticides on some Gram-negative bacteria (Enterobacteriaceae and Pseudomonadaceae).</i>	36
15:55 - 16:30	Debate	

16:30	Closing Ceremony Auditorium
-------	--

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Poster Session A		
Poster stand No.	Monday, 18 November 10:00 - 10:30H Algeria Time (UTC +1)/ Central European Time (UTC +1)/ Middle East Time (UTC +3)	Page
01	[12P02D-NC] Mr. José Domingo Sánchez Martínez <i>The Advance Of The Olive Grove In The Steppe Plateau Of Southeastern Andalusia</i>	37
02	[65C02R-NC] Mrs. Omrani Rachid <i>The Evaluation Measures Of Projects Aimed At Combating Soil Degradation In The Algerian Steppe And The Intelligence In Selecting Measurement Indicators Based On The Criteria Of Coherence, Relevance, Effectiveness, Impact, And Efficiency.</i>	38
03	[86C02A-NC] Mr. Tichoudad Tayeb <i>Correlation Of Precipitations And Cereal Cultures In Djelfa Province Case Study</i>	39
04	[16P03R-NC] Ms. Smaili Yasmina <i>Factors Of Degradation Of The Atlas Pistachio (Pistacia Atlantica) In The Algerian Steppe</i>	40
05	[05P07M-NC] Mr. Attou Alaa Eddine <i>Determining The Spatial And Temporal Distribution Of Drought Within The Algerian Steppe To Prove Climate Change.</i>	41
06	[06P07M-NC] Mr. Zahed Khalid <i>Studying Evapotranspiration Spatially Within The Algerian Steppes Using Geographic Information Systems To Determine Climate Change.</i>	42
07	[27P07R-NC] Mr. Sahli Youcef <i>Study Of The Hydrological Response Of The Soummam Watershed in The North East Of Algeria</i>	43
08	[31P07M-NC] Mr. Boubakeur Guesmi <i>Climatic Drought A Challenge To The Steppe Ecosystem And Vegetation Of Djelfa</i>	44
09	[57P07R-NC] Mr. Atif Foufou <i>Climate Change In Arid And Semi-Arid Areas: Comparative Study Of Their Impact On Water Resources In The Menia And Djelfa Regions.</i>	45
10	[99C07R-NC] Ms. Kerzabi Rachida <i>Impact Of Climate Change On The Development Of Halophytes In The Western Part Of Algeria</i>	46
11	[101P07R-NC] Mrs. Sarra Hennane <i>Assessment Of Pollution Dispersion And Climate Impacts From Industrial Activities In Sensitive Steppe Environment.</i>	47
12	[45C09R-NC] Mr. Trodi Fares <i>The Implementation Of Public And Landscaped Green Spaces In New Algerian Steppe Towns, Case Of Boughzoul (Algeria)</i>	48
13	[81C09D-NC] Mrs. Harzli Tawfiq <i>The Impact Of The Degradation Of The Steppe Environment On Population Changes, The Municipalities Of Al-Sharif And Al-Idrisiya In The State Of Djelfa As An Example</i>	49
14	[93C12R-NC] Mr. Azzouz Mohamed <i>Pastoralism In Algeria: An Eco-Cultural Heritage To Be Preserved For Future Generations</i>	50
15	[102P09R-NC] Mr. Rabhi Badreddine <i>Micro-regional imbalance of the agglomeration system and urban congestion in the city of Djelfa.</i>	51

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Poster Session B		
Poster stand No.	Monday, 18 November 15:00 - 15:30H Algeria Time (UTC +1)/ Central European Time (UTC +1)/ Middle East Time (UTC +3)	Page
01	[22C06T-NC] Mr. Djelaila Yassine <i>Characterisation Of Steppe Rangelands In The Wilaya Of El-Bayadh</i>	52
02	[29P06R-NC] Ms. Hamyeme Halima El Saadia <i>Contribution To The Study Of Mycorrhization In Some Plants From The Pre-Desert Region Of Algeria</i>	53
03	[32P06M-NC] Ms. Sabkhaoui Maroua Hibat Elmaoula <i>Phytoaccumulation Of Heavy Metals From Contaminated Soil Using A Spontaneous Plant (Astragalus Armatus) In The Algerian Steppe</i>	54
04	[33C06R-NC] Mr. Arous Ali <i>Effect Of Two Types Of Manure (Poultry And Rabbit) On The Growth And Yield Of Maize (Zea Mays L.) In The Ain Defla Region</i>	55
05	[36C06R-NC] Ms. Belaidi Yasmine <i>Rare Species In Algeria</i>	56
06	[54P06R-NC] Mr. Bachir Bouiadjra Mohammed El Amine <i>The Effect Of Sodium And Calcium Bentonite Amendment On The Performance Of Vicia Faba L. Bean Culture In Salty Soils Of Semi-Arid Regions, Case Of The Wilaya Of Relizane West Algeria.</i>	57
07	[68P06M-NC] Mr. Brahim Taibaoui <i>Application Of Geostatistics In The Study Of The Risk Of Degradation In The Southern Algerian Steppe Of Djelfa, Algeria</i>	58
08	[69P07R-06] Mrs. Zaoui Aicha <i>State Of Plant Biodiversity In The Natural Forests Of Djelfa: The Case Of S�nalba Chergui And Sehary Guebli</i>	59
09	[73P06R-NC] Ms. Guettaf Halima <i>Isolation And Characterization Of Plant Growth-Promoting Bacteria (Pgp) To Enhance The Growth Of Pinus Halepensis In The Combat Against Desertification In The Na�ma Steppe, Algeria</i>	60
10	[91P06R-NC] Ms. Rachda Berrached <i>Fungal Diversity In Rhizosphere Soil Of Artemisia Campestris L. At Chabka 2, Ain Fekka, Djelfa Department (Algeria)</i>	61
11	[100P15R-06] Ms. Fatima Benhaffaf <i>Isolation And Characterization Of Fungal Strains From Some Spontaneous Plants In The Laghouat Region.</i>	62
12	[08P10R-NC] Mr. Naimi Bendouina <i>Use Of Machine Learning Models And Sentinel_2 Data On Google Earth Engine For Mapping Land Use And Distribution Of Atlas Pistachio In The Provinces Of Naama And El Bayadh (South-West Algeria).</i>	63
13	[09P10R-NC] Ms. Madani Djamila <i>Analysis Of The Modifications And Degradation Of Natural Resources In The Steppic Zone: Case Of M' Cif (Msila)</i>	64
14	[28P10R-NC] Mr. Guerine Lakhdar <i>Spatial Evolution Of Silting In El-Bayadh And Naama Provinces: A Diachronic And Cartographic Approach Based On Sentinel-2A Imagery And Machine Learning</i>	65
15	[92C10R-NC] Mr. Ouabel Habib <i>Contribution And Evaluation Of Soil Quality In The Ammari Region, Tissemsilt</i>	66

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Poster stand No.	Poster Session C Tuesday, 19 November 10:00 - 10:30H Algeria Time (UTC +1)/ Central European Time (UTC +1)/ Middle East Time (UTC +3)	Page
01	[75C04R-NC] Mr. Salim Lamine <i>Hyperspectral Remote Sensing In Precision Agriculture: Present Status And Future Trends</i>	67
02	[98P04R-NC] Mr. Adel Boussaid <i>Transhumant Pastoralists And Sedentary Agro-Pastoralists Of The Central Algerian Steppe (Case Study Of Djelfa Province)</i>	68
03	[79P05R-NC] Mr. Mohamed Cherif Mustapha <i>Analysis Of Desertification Programs In The Algerian Steppes</i>	69
04	[40P11R-NC] Mrs. Tahani Derradji <i>Assessment And Mapping Of Soil Erosion Risk Using A Gis/Rusle Approach In The Watersheds Of Northeastern Algeria (Constantinois-Seybouse-Mellègue)</i>	70
05	[48P11R-NC] Mr. Gliz Mohamed <i>Estimation Of Land Loss In Semi-Arid Zone By Using Remote Sensing And Gis</i>	71
06	[64C11R-NC] Mr. Taabni Mohamed <i>Algerian Steppe Areas And Territorial Planning: Real Geographical And Biophysical Differentiations But Precise Delimitations Pending</i>	72
07	[70C11R-NC] Mr. Laouisset Mhamed Bensalah <i>Assessment Of Sensitivity To Desertification In The Middle-Oued-Touil Watershed Using The Medalus Approach</i>	74
08	[94P05R-11] Mr. Mohamed Lamine Taleb <i>Status Of The Boussaleh State Forest (Lardjem, Wilaya Of Tissemsilt) Using Normalized Difference Vegetation Index</i>	75
09	[18P14R-NC] Mr. Tiour Fahem <i>Impact Assessment Of The Waste Rock From The Boukhadra Mine On Soil Degradation In The Exploitation Area, Tebessa - Algeria.</i>	76
10	[26P14R-NC] Ms. Rania Arabi <i>Impact Of Environmental Factors On Some Secondary Metabolites Of Medicinal Plants</i>	77
11	[46P14R-NC] Mrs. Rafika Ghanai <i>Effect Of Salt Stress On Growth And Essential Oil Yield Of An Aromatic Plant</i>	78

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Poster Session D		
Poster stand No.	Tuesday, 19 November 15:00 - 15:30H Algeria Time (UTC +1)/ Central European Time (UTC +1)/ Middle East Time (UTC +3)	Page
01	[04P08R-NC] Mr. Rezig Walid <i>Assessment Of The El Kerma Wastewater Treatment Plant'S Performance At The Seor Level By Basin Sizing (Oran)</i>	79
02	[10P08M-NC] Mr. Bouteldjaoui Fateh <i>Assessment Of Groundwater Quality And Its Suitability For Agricultural Use In The Ain Oussera Plain, Djelfa, Algeria</i>	80
03	[24P08M-NC] Mr. Omar Elahcene <i>Frequency Analysis Of Precipitation: Case Of The Djelfa Station</i>	81
04	[34C08R-NC] Mr. Hennia Kaddour <i>Qualitative Management Of Groundwater In Steppe Areas: Case Of The Mio-Plio-Quaternary Aquifer In The Djelfa Syncline (Algeria)</i>	82
05	[44P08R-NC] Mrs. Hocine Lahouaria <i>Numerical Simulation Of Unsteady Flow Using Explicit Finite-Difference Method</i>	83
06	[49C08R-NC] Mr. Boukhari Yahia <i>Study Of The Effect Of Irrigation On The Characteristics Of Steppe Soils "Case Of The Irrigated Perimeter Of Zraguet, Wilaya Of Saida"</i>	84
07	[50P08R-NC] Mr. Tabjoun Ayoub <i>Identification Of Potential Groundwater Storage And Recharge Zones Using Gis, Remote Sensing, And Ahp : A Case Study Of The Chetma Plain, Southeast Algeria</i>	85
08	[60P08M-NC] Mr. Azouz Bouderbala <i>Assessment Of Climate And Land Use Changes On Groundwater Resources In The Oued Righ Region, Algeria</i>	86
09	[72P08R-NC] Ms. Aicha Rahmouni <i>The Identification Of Water Resources With Remote Sensing Using Modis Aqua/Terra And Spectral Indices In The Algerian Steppes</i>	87
10	[80P08R-NC] Mr. Nadjib Haied <i>Climate Change Effect On Water Resources Management In Wadi M'Zi Watershed (Laghouat)</i>	88
11	[83P08R-NC] Mr. Mohamed Azlaoui <i>Groundwater Resource Management In A Semi-Arid Area In Algeria: The Case Of The Ain El Ibel Syncline.</i>	89
12	[87P08M-NC] Mr. Karef Salah <i>Management Of Wastewater Through The Determination Of Performance Indicators Within Treatment</i>	90
13	[39P15R-NC] Mrs. Chouarfia Malika <i>Impact Of Climate Change On The Biodiversity In An Artificial Wetland In Laghouat Region Of South Algeria (El Kheneiga)</i>	91
14	[53P01R-15] Ms. Benabderrahmane Ahlame <i>The Role Of Endozoochria In The Dispersion And Regeneration Of Juniperus Phoenicea In The Central Saharian Atlas –Algeria</i>	92

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Abstracts of oral presentations

Session 1:

Theme 07: Climate change impacts on the steppe ecosystems

The role of dolines in climate change mitigation in the Mediterranean karst landscape

Breg Valjavec M.¹, Zorn M.^{1*} and Čarni A.²

¹Anton Melik Geographical Institute, Research Centre of the Slovenian Academy of Sciences and Arts, Slovenia

²Jovan Hadži Institute of Biology, Research Centre of the Slovenian Academy of Sciences and Arts, Slovenia

*matija.zorn@zrc-sazu.si

ABSTRACT

The aim of this study is to present some characteristics of dolines – closed karst depressions formed by the dissolution of carbonate rock – that demonstrate their role in mitigating climate change in the Mediterranean karst landscape, i.e. on the Kras Plateau, SW Slovenia. In the late Middle Ages and early modern times, forests were abundant on the Kras Plateau. Later the general trend of increasing agricultural density was accompanied by a growing number of small farms. This led to an intensification of land-use, e.g. the conversion of forests into pastures (pseudosteppe), meadows, vineyards and farmland often located in marginal environmental areas where soil erosion (wind and rain erosion) was a problem, resulting in a barren rocky landscape in some parts of the Kras Plateau. As dolines are natural soil traps, eroded soil accumulates at their bottom. Fine-grained, silty clay soils predominate, which can be up to several metres thick. Extensive reforestation projects followed at the end of the nineteenth century. These were later accompanied by ecological succession as a result of deagrarianization. In today's forested areas, the trees in the dolines are taller than outside the dolines, which is due to more sediment, more moisture and more soil organic matter. The thick clayey-silty Luvisols at the bottom of the dolines also have a higher soil organic carbon (SOC) storage capacity than the shallower soils on the surrounding plateau. In addition to the sediments and moisture, colder air can also be trapped at the bottom of the dolines, which means that dolines have a high protective potential for cold-adapted plant species that may be threatened by climate change.

Keywords: karst, dolines, climate change, land use, soil organic carbon, Kras Plateau, Slovenia.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

MODELISATION RUSLE/AHP SOIL EROSION ANALYSIS IN THE ALGERIAN HIGH PLATEAUS: THE IMPACT OF CLIMATE CHANGE AND DROUGHT THROUGH RUSLE/AHP MODELLING AND REMOTE SENSING

Imad-Eddine BOUZNAD^{1*}, Abderahmane Salem HACHI², Rabah ZEBBA¹, Tahani DERRADJI¹,
Ahmed Najib CHAKALI³, Habib MOUISSA⁴, Djamel BENGUSMIA⁵

¹Faculty of Natural Sciences and Life Sciences and Earth and Universe Sciences, 8 May 1945 University of Guelma, Algeria

²Terrainknowledge

³Laghouat University - Faculty of Civil Engineering and Architecture

⁴Department of Agricultural and Veterinary Sciences, Ziane Achour University, Djelfa, Algeria

⁵National Office for Studies on Rural Development (BNEDER), Cheraga, Algeria.

*bouznad.imad@gmail.com

ABSTRACT

Soil erosion represents a major degradation phenomenon affecting vast regions in Algeria, thus compromising the soil's ability to provide essential ecosystem services. Climate changes over the past decade have led to a decrease in precipitation, causing an alarming increase in soil erosion in the central Algerian high plateaus. We developed drought and land use maps for the period from 2000 to 2020 using remote sensing data and the Google Earth Engine platform. We estimated soil loss in this area using the Revised Universal Soil Loss Equation (RUSLE) model and the Analytical Hierarchy Process (AHP) method. Correlation analysis between drought indices, land use, and soil loss maps (RUSLE) identified the most significant factors associated with erosion rates. We established the relationship between drought conditions and vegetation using Pearson's correlation. Most watersheds in the central high plateaus experienced severe drought between 2000 and 2020, resulting in significant land change and degradation, with nearly 10% of the area exhibiting high soil erosion rates. We observed a positive relationship between drought indices and soil erosion values. However, large variations were noted in the spatial distribution of the correlation.

Keywords: Remote Sensing, Erosion, RUSLE, AHP, Drought, Land Use.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Climatic characterisation of the Wilaya of El Bayadh

Yassine DJELAILA*, Houcine BOUZAD and Zohra BENAMOR

Department of Ecology, Institute of Sciences / Nour Bachir University Centre, El Bayadh, Algeria.

*djelailay@yahoo.fr

ABSTRACT

Climatic variability as a phenomenon has long been studied and characterised in the semi-arid zones of Algeria. The steppe region of El Bayadh has long been known for its rigorous winter cold and abundant frost, to the point of being known as a cold country.

The results of this work are obtained by using remote sensing and GIS technology to study bioclimatic changes in the Wilaya of El-Bayadh.

The main objective of our work is to use a statistical approach to determine recent changes in rainfall and maximum and minimum temperatures in the El-Bayadh region over a 39-year period from 1980 to 2018.

This involves, on the one hand, a temporal analysis of precipitation and maximum and minimum temperature using a set of statistical tests to determine precipitation trends, and on the other hand, a study of the spatial variability of precipitation. We developed our research using a field approach, collecting the climatic data needed to diagnose the stations studied (the 22 communes of the Wilaya of El-Bayadh) from the world clim website.

This study shows that the climate of the El Bayadh region has undergone a radical change, moving from a SEMI-ARID climate to a SAHARAN climate characterised by a drop in annual rainfall and an increase in the minimum temperature, which means accentuated drought and increasingly hot winters.

Key words: El-Bayadh- Climate indicators- Precipitation.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Arbuscular mycorrhizal fungi mitigate negative effects of climate change in steppe ecosystems

BENCHERIF Karima^{1*}, TIFOUR Maghnia², LOUNES HADJ-SAHRAOUI Anissa³

¹Laboratoires des recherches appliquées aux sciences du végétal. Université de Djelfa.

²Faculté des sciences de la Nature et de la Vie. Université de Djelfa.

³Unité de chimie environnementale et interaction sur le vivant, Université du Littoral Côte d'Opale.

*Bencherif_karima@yahoo.fr/ k.bencherif@univ-djelfa.dz.

ABSTRACT

Climate change negatively affects the steppe ecosystem by increasing several abiotic stresses such as soil salinity. This negatively affects plant growth by disrupting their physiological mechanisms due to excessive Na⁺ and Cl⁻ ions toxicity to the cell. To avoid these negative effects, plants need a natural solution, including a symbiotic association with microorganisms in the rhizosphere, such as arbuscular mycorrhizal fungi (AMF).

The present study aims to compare the efficacy of two AMF inoculants, one native from saline steppe soils and the other commercial, on the growth and mineral nutrition of two plant species: *Tamarix articulata* halophytic shrubs and *Medicago sativa* legume species. Rhizospheric microbial biomass was also assessed using fatty acid biomarkers specific for AMF, saprotrophic fungi and bacteria.

The results showed that native inoculation increased plant biomasses, total mycorrhizal rate, mineral nutrition for the two studied species by about 20, 30 and 25% respectively for *Medicago stiva* and about 40, 45 and 35% for *T. articulata*. Soil microbial biomass increases for the two studied species with native inoculum for *T. articulata* with 46% for AMF, 25% for saprotrophic fungi and 15% for bacterial biomass. Similarly, soil microbial biomasses with native inoculum outperform commercial inoculum by 30% for AMF, 20% for saprotrophic fungi and 20% for bacterial biomasses.

The present results open the way for the preferential use of native strains as inoculum to carry out revegetation, agricultural plantation and saline soil restoration in steppe ecosystems.

Key words: mycorrhizal inoculation, plants biomasses, *Tamarix articulata*, *Medicago sativa*, microbial biomasses, mineral nutrition.



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

PHENOLOGY MONITORING: PPM A BIOLOGICAL MODEL FOR CLIMATE CHANGE

Sara HEZIL^{1*} and Gahdab CHAKALI²

¹Centre de Recherche en Agropastoralisme- CRAPast, Djelfa, Algeria,

²Ecole Nationale Supérieure d'Agronomie, Département de Zoologie Agricole et Forestière
El-Harrach, Alger, Algérie

*sara.hezil.ensa@gmail.com/ sara.hezil@crapast.dz

ABSTRACT

One of the most important pests of pine forests in semi-arid area, the pine processionary moth, *Thaumetopoea pityocampa* (PPM). Unlike most other insects, the larval development of the PPM occurs during fall and winter and is highly susceptible to temperature variations. PPM is considered as a bio indicator model that describing its spread was developed to simulate its potential range under various climate change scenario. This investigation was conducted in the semi-arid of Aleppo pine forests, we applied an advanced model based on PPM phenology models as a dynamic of occupation and distribution of PPM nests across different spatial and temporal scales. Results showed that in response to a warming climate, PPM is expanding its range northwards. The phenology of PPM reflects the integrated response of the multiple life stages to their environment. Increasing temperatures typically accelerate its development.

Keywords: Aleppo pine forest, bio-indecator, climate change, model, processionary moth.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Session 2:

Theme 06: Land degradation and the way of ecological restoration of soils structure

Applying joint species distribution modelling to understand the relative influence of each ecological filter in the El Bayadh steppe community assembly

Patrick nino Oloumane¹, Wael elzerey², Carlo prévil³

¹Département des sciences de l'environnement/UQAT, Canada

²Département de chimie/Université d'Oran, Algérie

³Département des sciences de l'environnement/UQAT, Canada

Email : Patrick-Nino.Oloumane@uqat.ca

ABSTRACT

The primary concern of ecologists in community assembly is to determine the relative influence of various ecological filters to enhance ecosystem conservation. In the El Bayadh steppe, overgrazing and water scarcity have been identified as the main ecological filter of the community assembly. In this study, we used a joint species distribution model to assess whether factors such as topography, soil characteristics, sand encroachment, and plant competition, along with the roles of functional traits and phylogeny, influence species plant establishment and persistence within the El Bayadh steppe community.

Data on soil characteristics, topography, climate, and land use type were collected from 50 plots across the study area. Functional traits—including root length (R), leaf area (LA), specific leaf area (SLA), plant height (H), clonality (CL), life history (LS), and seed mass (SM)—were gathered from 24 species within these plots. These data were used to implement a Species Distribution Model (SDM) using Hierarchical Modeling of Species Communities (HMSC) as the statistical framework.

Our results indicate that soil properties were the most influential factor, explaining 37.8% of the variance, followed by precipitation (21.7%), elevation (15.9%), sand encroachment (10.9%), and land use type (7%). Species co-occurrence patterns suggest that competition plays a minimal role in species distribution within the El Bayadh steppe, as most species were not significantly associated with one another.

Additionally, we found that the phylogenetic signal was weak ($E(p) = 0.19$), suggesting that traits associated with specific ecological strategies are not consistently shared among closely related species. Furthermore, all functional traits responded to multiple explanatory variables simultaneously, emphasizing their importance in plant adaptation strategies to environmental change. Our findings provide a comprehensive understanding of community assembly in the El Bayadh steppe, highlighting the relative influence of each ecological filter. These insights can help improve conservation strategies for this fragile ecosystem.

Keywords: Community Assembly, Species Distribution Model (SDM), Ecological filter, functional Traits, Phylogeny, Conservation Strategies, El Bayadh steppe.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Agroforestry potential impacts on agricultural land fertility of foothills North-West of Dahra (Mostaganem, Algeria)

Hamadi AMINA¹, Larid MOHAMED^{1*}, Gómez Calero JOSÉ ALFONSO² and Ouabel HABIB³

¹Departement of Agronomy, Life and Nature sciences Faculty, University of Mostaganem, Algérie

²Institute of Sustainable Agriculture, CSIC, Cordoba, Spain.

³Departement of Biology Sciences, University Centre of Tissemsilt, Algeria

*a_hamadi_m@yahoo.fr

ABSTRACT

In order to guarantee a stable offer and healthy food, the new techniques of maintaining and improving the natural capacity agricultural land must take up an appropriate measure for each environment. However, the identification and the valorization of all local the dynamics of production systems must ensure the conservation of agricultural land biological fertility and improved management of the fertilizer. After a bioclimatic overview of the study area (foothills of North-west Dahra) and a typology of farms, a selection was made of four most cropping systems practiced (agroforestry, arboriculture and/or vineyard, annual crop and fallow) for a comparative study conducted from the physico-chemical and fertility analyzes of soil samples taken from each system. The results show that the MO levels are closely related to the cropping system and more particularly the agroforestry, climatic factors, texture, fertilizer and tillage.

The ANOVA statistical analysis revealed a significant variability in the biological C/N ratio in the studied soils with a range from 11.02 to 14.94 % and the exchangeable cations (Ca⁺⁺, Mg⁺⁺, Na⁺ and K⁺) are positively influenced by the arboreal and agroforestry systems. Although the evolution of organic matter is judged in these soils satisfactory, it is important to point out that their OM content is insufficient. However, this low OM content can lead to a variable decrease in soil fertility.

Keeping in mind that the ideal C/N ratio is between 11 and 15%. It would be beneficial to consider soil management practices aimed at increasing the organic matter content, while preserving the environment. Therefore, the use of biological measures offers more prospects for the sustainable agriculture. In semi-arid environment. Where the agroforestry practices and green fertilizer must contribute effectively to the increase in the rate of OM and the soils mineral component and indirectly to bio-fertility.

Keywords: Crop system, agroforestry, soil fertility, organic matter, foothills, Dahra, semi-arid.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

LAND DEGRADATION AND VEGETATION RESTORATION TECHNIQUES

Hamida MALLEM^{1,2,*}

¹Department of agricultural sciences, Faculty of sciences / Institute, Amar Telidji University, Laghouat, Algeria

²Mechanics Laboratory, Natural Resources and Environment Team, Amar Telidji University, Laghouat, Algeria

*email: h.mallem@lagh-univ.dz

ABSTRACT

In arid and Saharan areas, drought and human activities accentuate the risk of degradation of pre-desert rangelands. Some plants disappear and others persist and manage to adapt. In this study, we aimed to identify plants that can grow in a sandy environment and to investigate their distribution levels on sand dunes and their effects on dune soil. We sampled soil under three perennial plants (*Retama raetam*, *Aristida pungens*, and *Astragalus armatus*); the physical and microbiological characteristics of the soil were analyzed and compared to those of dune soil without vegetation. *Astragalus armatus*, a non-palatable plant, proliferated widely in the environment. Noting that *A. pungens* showed the lowest values up to 29 cm of fixed sand. The micro dune under *A. pungens* did not contain silt and clay (0%). The micro dune fixed by *A. armatus* contained more silt and clay with respectively (9%, 10%). The micro dune of the soil fixed by *R. raetam* showed the highest levels of N, C and bacterial richness with respectively (0.08%, 0.82%, 1.21x10⁵ cfu/g). The micro dune fixed by *A. pungens* had a high content of CaCO₃, electrical conductivity and fungal richness with respectively (2.37%, 0.92 ms.cm⁻¹ and 0.63x10⁵ spores.g⁻¹). The three species *Astragalus armatus*, *Retama raetam*, *Aristida pungens* showed a significant affinity for the mycorrhizal symbiotic association (with a rate of 80%, 75%, 69% respectively) which plays a significant role in the soil-plant system, particularly by facilitating plant nutrition and improving their resistance to biotic and abiotic stresses. At the end of this study, we observed the particular effects of each plant on the rehabilitation of degraded soils, the association of these plants presented a remarkable complementarity.

Keywords: drought, vegetation, soil, mycorrhizae, restoration

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Session 3:

Theme 06: Land degradation and the way of ecological restoration of soils structure

SOILS MICRO BIODIVERSITY AND CONSERVATION

Nadiradze K.^{1*}

¹Chair, DesertNET International, France

*nadiradzekakha@gmail.com

ABSTRACT

The Deforestation, Climate change, Mono cultural Crops, Overused Pesticides and Herbicides are the key challenges for the present and the future posing major risks to the Soils Micro Biodiversity Conservation and we are still capable to minimize the negative consequences affect not only Scientific approaches, but also by Nature Based Solutions, NBS and best practices to respond the disproportionate impact on soils declined and weaker Micro Biota but also by considering the Conservation of Soils Microbiota to implement effective mitigation and adaptation strategies. One of the most commonly used methods is Increasing soil organic matter, adding the organic additives straw, slurry, crop and food residues waste from living plants like grass ley, perennial crops that may positively affect all three components of soil health: the physics, the biology and the chemistry. It is not only the quantity of organic matter added that is important, the quality is crucial as well. DesertNET International aims at preparing professional references for managing the complex and multi-faceted risks posed by climate change, and especially anthropogenic factors as well as the opportunities that might arise. It features the collaboration of an increasing number of partners from the DNI Academia, Members, and Practitioners and these recommendations could better delivered to local Farmers and Rural Communities to minimize the Soil Surface disturbance by No-till or conservation tillage Cover crops; Relay crops Diverse crop rotations Perennial crops Organic fertilizer use (manures) Crop residue retention Integrated pest management Broad spectrum herbicides Weed control by mulching and/or cultural tactics

Keywords: (Micro Biota, Climate Change, Nature Based Solutions.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

IMPROVING SEED GERMINATION OF NATIVE SPECIES FOR ALGERIAN SAHARAN RANGELAND RESTORATION: EFFECTS OF COLD STRATIFICATION

Mériem MARFOUA^{1*}, Elise BUISSON²

¹Department of Agricultural Sciences, Faculty of Sciences, Amar TELIDJI University, Laghouat, Algeria

²Mediterranean Institute of Biodiversity and Ecology (IMBE), Avignon University, CNRS, IRD, Aix Marseille University, Avignon, France

*m.marfoua@lagh-univ.dz

ABSTRACT

In Algeria, the spontaneous plants of the Saharan ecosystem have a remarkable importance because of their uses as pasture, food and medicine. Unfortunately, they face with different types of stress. Only native species can withstand prolonged droughts remarkably well: they remain in the seed state; while their regeneration, especially after strong anthropogenic disturbances, constitutes a challenge for their conservation. We propose by this study to highlight the suitability of ecological restoration by studying morphological and physiological characteristics. On field (31°38'49"N to 32°25'24"N and 4°17'11"E to 5°23'27"E), we collected seed samples from some plants in naturel grazing areas (*Erg*, *Hamada*, *Regs*, depressions: *Daya*, *Oued*, *Sebkha* and *Chott*). In the laboratory, we tested the germinative behavior of forty-six dominant native species (19 botanical families), from camel rangelands recommended for ecological restoration was studied. For the effect of the thermal factor (5, 10, 15, 20, 25, 30, 35 and 40°C), salt stress (0, 50, 100, 150, 200 and 250mM) and light. Germination is assessed by germination mean percentage (PMG %) and mean germination time (GMT). This study showed that temperatures between 10 and 30°C were favorable for seed germination of most species studied except *Limoniastrum guyonianum* (*Plumbaginaceae*); *Stipagrostis pungens* (*Poaceae*); *Peganum harmala* (*Zygophyllaceae*) for which the thermal optimum is higher (35 to 40°C). The effect of salt stress revealed that the elevation of NaCl concentration induced a reduction in the capacity and rate of germination. Concentrations of 200mM NaCl (12g/l) constitute a physiological germination limit for all species studied. Light germination was significantly greater than in the dark. Physiological dormancy (PD) is the type of dormancy characteristic of most of the seeds studied. The effects of cold scarification and GA₃ steeping pretreatments (50, 100, 150 and 200ppm) on seed dormancy showed that 46% of the species germinated after cold treatment. It seems that gibberellic acid did not replace cold stratification. The latter managed to increase the germination rate in less time. Our results suggest that cold stratification is an efficient and easy treatment to apply prior to sowing seeds in the field for restoration.

Keywords: Native plants; rangelands; ecological restoration; seed germination; seed dormancy.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

ENVIRONMENTAL IMPACT OF CHROMIUM EMISSIONS FROM THE DJELFA TANNERY

BATANA FZ^{1*}, KAREF S², BENALIA M³

^{1,3}Department of Process Engineering, Faculty of Technology, University of Laghouat, Algeria

²Faculty of Technology, University of Djelfa, Algeria

*fzbatana@gmail.com

ABSTRACT

Soil is seen as a medium capable of absorbing all kinds of pollutants and residues, without any thought for the damage it suffers and the resulting consequences for its use and the environment.

For years, attention was focused on visible phenomena such as water and air pollution. Recently, soil and subsoil pollution have been included in the fight to protect the environment.

Industrial discharges including tanneries, atmospheric fallout, pesticide use and mining are responsible for the contamination of soils and subsoils by heavy metals such as chromium which is toxic, non-biodegradable and persistent in the environment that can lead to long-term health problems while negatively affecting biodiversity.

In order to study soil contamination by chromium, batch adsorption experiments have been conducted to evaluate the mobility and the retention of this pollutant.

Analysis of the adsorbed chromium has been realized by Atomic Absorption Spectroscopy (AAS).

These experiments were carried out on a soil located near an industrial zone in Djelfa, the mineralogical and physicochemical characteristics have been studied previously. The soil studied is a very complex matrix made up of sand, silt, clay and various oxides. In the first part, we optimized certain parameters in this phenomenon such as (soil quantity, solid / liquid ratio, pH, ionic strength) and we obtained good results using a solid/liquid ratio of 1/5, pH between 6 and 8 and ionic strength of 0.01 mg. L⁻¹ NaNO₃. The second part of this study is devoted to adsorption kinetics. It showed that an equilibrium is reached after 10 minutes of contact indicating a fast pseudo second-order reaction and the presence of two steps, confirming that intra-particle diffusion is not the only limiting step. The third part is relative to the adsorption isotherms and the results showed that they are of L type and their linearization indicates that the Langmuir model is better fitted for the adsorption process. The results demonstrate that the soil constituents and its physico-chemical properties play a significant role on the retention of chromium on the soil.

Keywords: Chromium, soil, retention, adsorption, kinetics, isotherm.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

RESTORATION STRATEGIES FOR DEGRADED ALGERIAN STEPPE: INSIGHTS FROM COMPARATIVE VEGETATION ANALYSIS IN MHAKA REGION"

Nawel GANAOU^{1*}, Souhila CHADLI², Maroua GANAOU³

¹Laboratory of rural economic development, University of Ibn Khaldoun, Algeria

²University of Ibn Khaldoun Tiaret, Algeria

³Épidémiologie, santé, production et reproduction, expérimentation et thérapie cellulaire des animaux domestiques et sauvages, university of Chadli Bendjedid El Tarf, Algeria

*ganaoui.nawel@gmail.com

ABSTRACT

The climatic conditions and anthropogenic actions have seriously weakened the Algerian steppe. The main objective of this study is the development of techniques for the regeneration of this formation. By conducting an inventory of the floral diversity in the Mhaka region, located in the province of Tiaret northwestern Algeria in 2023, the chosen method to approach this subject is a comparative analysis of the vegetation's diversity in a protected area, which allows for the evaluation of the degradation or restoration of the structure and functioning of the closed steppe pastures since 2007 compared by freely grazed areas.

"Six floristic surveys were conducted in the enclosed area with a total area of 3,300 hectares. Two surveys were carried out in the freely grazed pastures with a total area of 1,100 hectares. The samples were taken from minimum areas of 500 square meters."

The results revealed the presence of 67 species belonging to 26 families in grazing-excluded rangelands and only two species were recorded in free-grazing rangelands

The biological spectrum indicates a predominance of therophytes and chamaephytes, with geophytes. The most important families are Poaceae and Asteraceae in both research periods, the number of species is higher. The Shannon-Weaver diversity index is relatively high 4.86 indicating a high diversity in the grazing-excluded rangelands compared to free-grazing rangelands.

The dominance of therophytes compared to other biological types indicates environmental disturbances (overgrazing, drought) that favor their proliferation, while phanerophytes, hemicryptophytes, and geophytes decrease due to increasing aridity. Chamaephytes are better adapted to drought than phanerophytes due to their more excellent xerophytic resistance.

The installation of a monitoring system for steppe ecosystems through organized grazing could be a solution for the rehabilitation of the Algerian steppe.

Keywords: degradation, desertification, Steppe, mise en defend , restauration

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Session 4:

Theme 04: Local geography and agricultural challenge (pastoralism, livestock herding and nomads).

Theme 05: Geographical solutions to combat desertification and deforestation.

Theme 09: Urban planning for steppe cities and pastoral land protection

Theme 14: Evaluation of the impact of land degradation on the availability of medicinal plants.

Taking account of fighting land degradation in urban planning in steppe environment: a prospective inventory

Keira BACHAR^{1*}

¹Department of Earth and Universe Sciences, Faculty of Natural and Life Sciences, University of Djelfa, Algeria

*kebachar@yahoo.fr - k.bachar@univ-djelfa.dz

ABSTRACT

The Algerian highlands stretch from east to west over an area covering 20 million hectares, representing 9% of the country, and forming a buffer between coastal Algeria to the north and Saharan Algeria to the south. One of the main threats to this steppe ecosystem is desertification, which is not an advance of the desert, but is defined by the United Nations Convention to Combat Desertification (UNCCD) (ratified by Algeria) as land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climate change and human activities. The National Action Programs to Combat Desertification (NAPCD) are the strategic tools for implementing the Convention at national level. With more than 80% of the steppe cover degraded, the fight against desertification is essentially based on rural development programs through reforestation projects and water and soil conservation programs, as well as rural development projects to support agriculture and livestock farming and improve rural infrastructures. However, the rapid progression of silting, caused by wind erosion, not only affects agricultural land, it also threatens urban areas and affects the environment and way of life of urban populations. Today, almost 70% of Algerians live in cities, which are characterised by rapid demographic growth and urbanisation. This is why it seems appropriate to approach the fight against desertification from an urban perspective, or through the prism of urban development, by proposing actions at urban level as part of Sustainable Urban Development.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

By relying on a review of scientific literature, case examples and field observations, this contribution proposes a non-exhaustive prospective inventory and a reflection on the possible strategies and forms of action for taking account of the desertification phenomenon in planning operations and protection of urban areas through regulatory tools and/or technical resources such as : integrating the fight against desertification into urban planning (PDAU, POS or new documents currently being studied); geometry of urban forms to avoid silting up, urban density; windbreaks; green infrastructure (green belts - urban parks; green grids; urban and peri-urban forestry; promotion of urban agriculture; local green areas made up of adapted plants to aridity (xeriscaping)); water and biodiversity preservation policies.

Keywords: urban planning, land degradation, steppe environment, sustainable development, strategies, forms of action

Biophysiological Effects of *Atriplex canescens* Introduction on Degraded Rangeland Vegetation in a Semi-Arid Climate

Benyahia M.E.^{1*}, Houyou Z.², Allal F.² and Louassa S.¹

¹Laboratory of biological and agronomic sciences, University of Laghouat, Algeria

²Laboratory of Mechanics, University of Laghouat., Algeria

*me.benyahia@lagh-univ.dz

ABSTRACT

Steppe environments present abiotic constraints that influence the physiological processes of plant communities. This research examines relationships between plant groupings and stress responses (biochemical and physiological) in a Sebtag (Algeria) plantation under a semi-arid climate. We conducted a floristic survey and measured water, total sugars, chlorophyll, and proline levels in fresh leaves of all identified plant species within the *Atriplex canescens* plantation. Our findings revealed a moderate level of plant diversity, with seven species found across six families. The seven identified species exhibited spatial preferences, forming four distinct groups: *Artemisia alba turra* occurred independently, while *Retama reatam* and *Atriplex canescens* co-existed. *Stipa tenacissima* and *Echinops spinosus* were found together, and *Salvia verbenaca* preferred to grow in isolation. The planted *Atriplex canescens* exhibited high dominance, exceeding 80% of the available space. This dominance likely explains the low Shannon diversity index (1.09) and Equitability (38%). Analysis of stress indicators revealed the group containing the planted *Atriplex canescens* and *Retama raetam* exhibited the lowest stress levels.

Keywords: Steppe, climate variation, plant grouping, stress, proline

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

A sustainable integrated approach to the use of the semi-arid Algerian steppe forests soils and regulation of socio-ecological risk factors through regulatory rural management

GASMI Bensalah

University of Ziane Achour Djelfa

bensalah.gasmi@univ-djelfa.dz Tel : 0671286131

NOUARI S. USTHB Alger

REZAZ M.A. USTHB Alger

ABSTRACT

Our research focuses on enhancing agropastoral activities in the Algerian steppe by addressing the unsustainable use of soil. The misuse of soil has led to rapid degradation due to improper socio-economic and socio ecological practices. Our study demonstrates that implementing an integrated approach to agropastoral exploitation, guided by effective rural management strategies that prioritize economic viability, social equity, and environmental sustainability, can effectively mitigate the socioecological soil risk factors associated with steppes semi-arid agroforestry. This approach aims to alleviate the significant pressure and stress impacting the ecological soil sub-system of the Algerian steppe forest.

The methodology employed involves a comprehensive and systematic analysis of the semi-arid forest steppe ecological soil system, utilizing multifunctional system analysis. The objective is to thoroughly investigate the diverse functions and aspects within the semi-arid agroforestry soil system, to address multiple functions and aspects comprehensively.

The integrated approach reinforced the semi-arid Senalba Chergui forest agroforestry operations of Djelfa, this area serves as a test site and has reaped the rural housing program benefits, which solidifies the rural subsystem development with its peri-urban area of Djelfa city appearances. In assumption, the strategic sustainable vision for land use aims to rationalize and regulate the ecological agroforestry system for soil conservation.

Keywords: Agroforestry soil conservation, semi-arid forest system, rural housing program, integrated approach, Senalba Chergui forest.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

THE ENVIRONMENTAL ADVANTAGES OF THE CULTIVATION OF ALGERIAN ALFA AS AN ENERGY CROP FOR BIOENERGIE PRODUCTION

Maroua GARES^{1*}, Serge HILIGSMANN² and Noredine KACEM CHAOUICHE¹

¹Laboratory of Mycology, Biotechnology and Microbial Activity (LaMyBAM). Department of Applied Biology, FSNV, University of Brothers Mentouri, 25017 Constantine, Algeria.

²BIO-BioTech, Université Libre de Bruxelles ULB, Av. F. Roosevelt 50, CP 165/61, Brussels- Belgium.

*Corresponding author's email: maroua.gares@umc.edu.dz

ABSTRACT

Alfa (*Stipa tenacissima*), also called halfah or esparto grass, is typically a fast-growing Mediterranean perennial plant. This herb is a common grass in North Africa, particularly in the highlands of Algeria. One hectare can produce more than one ton of dry biomass per year. This herb covers approximately a surface area of 4 million ha. Indeed, it is used in the artisanal field, in agriculture, and in the paper industry. The interest in this crop as a potential source of G2BP lies in its adaptation to a semi-arid climate. Recently, studies have been carried out to optimize the pretreatment of Alfa fibers for the G2BP. Alfa's annual production can reach up to 250,000 metric tons per year. The exploitation has reached only 3 million ha from the total of Alfa lands, whereas more than one million ha of Alfa territories have not been exploited and used effectively. The high concentration of polysaccharides gives Alfa a real potential for its integration as a raw material for bioethanol production. In fact, the biochemical composition of Alfa was evaluated and analyzed by HPLC using concentrated and diluted sulfuric acid hydrolysis. Indeed, the sugar contents of Alfa are quite high (46–47% glucose, 12.5–13.33% xylose). On the other hand, many researchers suggest that the cultivation of drought-tolerant energy crops should be the most relevant choice in terms of both adaptation and environmental sustainability. In fact, in the Algerian highlands, which occupy about 9% of the total area (21,435,660 ha), almost two-thirds of the land is cultivated. Therefore, more than 7 million ha could be exploited for Alfa cultivation since the bioclimatic conditions are suitable for its growth. Theoretically, more than 7 million tons of dry biomass could be generated from these areas. Thus, more than 700 million liters of ethanol with an energetic potential of 0.3 million tonne oil equivalent could be produced. Besides its energy importance, the environmental benefits from Alfa cultivation are phenomenal; the desertification process is so important in these areas due to drought and the weakening of soils subject to wind erosion. Alfa cultivation forms a key component for arid and semi-arid ecosystem sustainability. Its resistance to long drought periods, the protection of soil against erosion, its resprouting ability, and its ecological amplitude make it a very valuable species with a view to using it in restoration programs.

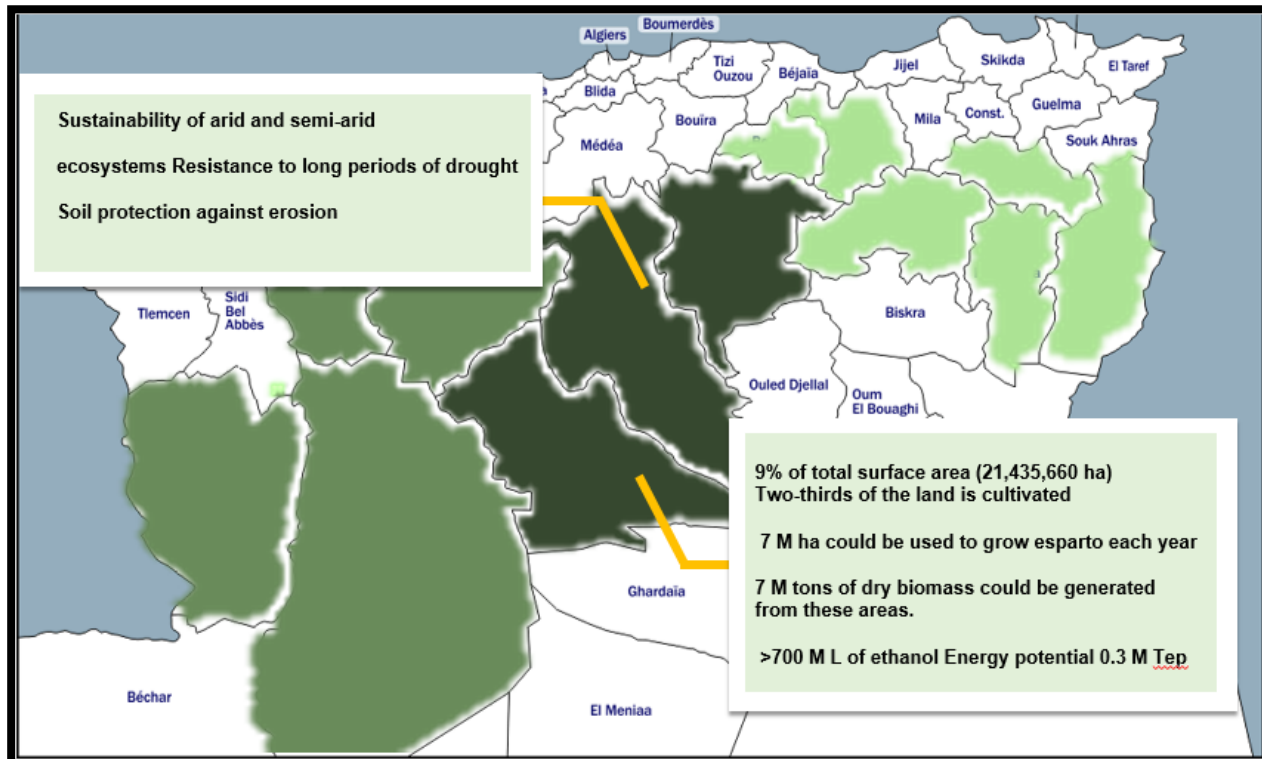
Keywords: Alfa *Stipa tenacissima*, second-generation bioethanol production, energy crop.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

GRAPHICAL ABSTRACT



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

IMPACT OF INCORPORATION OF 40% BREWER'S GRAIN SPENT ON SERUM PARAMETERS AND FATTY ACIDS PROFILE OF TAADMITE SHEEP MEAT

Nabila BERRIGHI^{1,2*} and Aslan Özlem³

¹Laboratory of Biotechnology Applied to Agriculture and Environmental Preservation. Mostaganem. Algeria.

²Higher School of Agronomy. Mostaganem. Algeria.

³TUBITAK MRC Life Sciences, Barış Mah. No:1 P.K. 21, 41470, Gebze Kocaeli, Turkey.

* Corresponding author's email: n.berrighi@esa-mosta.dz

ABSTRACT

The use of agro industrial by-products in ruminant nutrition to be an interesting alternative in order to reduce production costs and environmental impacts arising from the inadequate destination of residues. The low cost of this fodder also has an impact on the economics of production. In this contribution, we evaluated the effect of replacing brewer's grain with concentrate feed on the growth performance and serum parameters of lamb. The investigation was carried out during the spring season on two groups of Taadmite breed lambs raised in the Western pastures of Algeria (40% brewer's and 40% concentrate) and those from the other group of the Mostaganem region (70% concentrate). The blood was collected at the beginning of March, the middle of April and at the end of May 2024 from the jugular vein of the animal and collected in tubes previously heparinized (10µl/ml) and stored at 4°C until centrifugation (3500 g, 15 min, 4°C), in order to recover the serum. Serum was stored at -20°C for biochemical analyses. From the results obtained, it is clear that blood sugar increases but not significantly during the sampling period. Levels of around 55.26 mg/dl and 64.55 mg/dl were noted for lambs from the group 1 and 2, respectively. These values can be influenced by intrinsic (sex, age) and extrinsic (environment) factors. The results obtained suggest that the sampling period has no significant effect on the triglyceride content, a high content was described for group 1 (0.86 mmol/l vs. 0.83 mmol/l), with the exception of the cholesterol level. The meat of lambs fed on WBG also had a lighter color and a lower intramuscular fat content. Additionally, the meat of this group was also characterized by higher PUFA ($p < 0.001$) and C18:2cis9, trans11 fatty acid ($p < 0.001$) contents. Overall, the effect of brewer's spent grain on meat quality, it is also important to emphasize that the Western Algerian ecosystem is very interesting for outdoor sheep breeding which allows to obtain a healthy meat with attractive sensory quality

Keywords: Brewer's grain spent, Fatty acids, meat quality, serum parameters, Taadmite lamb breed, qualité

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Session 5:

Theme 11: Technological innovations, monitoring and assessment of land degradation and desertification

CONTRIBUTION OF SATELLITE IMAGES IN MONITORING THE DYNAMICS OF DEGRADATION PHENOMENA IN STEPPE ECOSYSTEMS, CASE OF DJELFA REGION, ALGERIA

Taibaoui B. ^{*1}, Douaoui A. ²

¹Biology Department, Faculty of Nature and Life Sciences, University Z. A., Djelfa, Algeria.

²Biology Department, Faculty of Nature and Life Sciences, University Center M. A., Tipaza., Algeria.

*ecotyb@gmail.com

ABSTRACT

The use of satellite images and geographic information systems has enabled us to monitor the degradation of vegetation cover in our study area; Through the analysis of Landsat series from 1987 to 2022, with the aim of monitoring vegetation dynamics and ecological changes in the various landscape components of steppe natural environments in our study area, which has enabled us to make the following constations: The extension of the surface areas of degraded units such as sand, bare soil, degraded steppe and cultivated land, to the detriment of steppe vegetation units dominated by : *Stipa tenacissima* & *Stipa parviflora* or those dominated by climatic species to the benefit of degradation formations dominated by ruderal species, such as *Peganum harmala*, *Atractylis serratuloides*, etc. on the one hand and on the other hand, we clearly noted the degradation of forest and pre-forest areas to the benefit of various degradation formations dominated by ephemeral plants.

Keywords: Remote sensing; GIS; Steppe; Degradation; Djelfa; Phyto ecology; Dynamism.



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Assessment and Mapping of Desertification Sensitivity in Khenchela Province: Integrating GIS and AHP Methodology

Abdelhafud Bouzekri

Laboratory of Algerian Forests and Climate Change, Higher National School of Forests, 40000 Khenchela,
Algeria.

*hafid123bouzekri@gmail.com

ABSTRACT

Desertification, a major challenge in Algeria, is due to excessive land exploitation and climatic variations. Khenchela province, facing rapid resource degradation, is particularly affected by desertification, resulting in decreased vegetation cover and deterioration of soils and water resources. Human activities and climate change act synergistically to exacerbate these issues, making arid and semi-arid regions sensitive to sand encroachment, wind erosion, deforestation, and Stalination. This research endeavors to pioneer a sophisticated multicriteria evaluation methodology tailored for assessing desertification risk zones within the context of a Mediterranean steppe, characterized by its arid and semi-arid conditions and delicate soil composition highly susceptible to human activities and climate fluctuations. Leveraging an integrated approach combining geographic information systems techniques, remote sensing data, and the Analytic Hierarchy Process (AHP), this study enables the precise identification of priority areas crucial for mitigating this significant risk, thereby furnishing an invaluable decision-making framework essential for strategic project planning and execution. We took into account the four dominant criteria (vegetation, climate, soil, and socio-economic stakes) in this assessment. The assessment of desertification sensitivity in Khenchela region has revealed a decision-making map categorizing the study area into four situations based on the degree of risk. This map demonstrates that over half of the region is threatened by this phenomenon, with 32.48% of the area considered fragile and 24% in a critical and irreversible situation. These cartographic results aim to inform decision-makers and planners about critical desertification-risk areas, guiding the selection of priority interventions.

Keywords: Desertification, Mapping, Assessment, Khenchela, GIS, AHP.



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

THE SPATIAL TOOL IN DETERMINING THE IMPACTS OF CLIMATE CHANGE ON THE PASTORAL AREA OF ALGERIA “CASE OF EL BAYADH”

Zegrar Ahmed, Bentekhici Nadjla

Department, of observing the earth/Center of Spaces Technics, Algeria

z_ahmed65@yahoo.fr (Corresponding author)

ABSTRACT

For more than twenty years, the Algerian steppes have experienced profound changes in the occupation and management of space, associated with a breakdown in the balance between pastoral production systems and available resources. This disruption of balance is largely explained by a worsening of constraints linked to climate change, but it is also reinforced by mutations linked to the evolution of societies. Pastoralism in the steppe, as elsewhere, relies on the availability of fodder in pastures, which allows animals to be fed. Natural rangeland resources are decreasing in both surface area and productivity, while livestock numbers are increasing to meet the food demand of growing populations. In this work, we propose an approach for diachronic analysis of land cover by processing Landsat multispectral images of a multi-temporal series in two periods: winter and summer, with the analysis of the monthly regime of the rainfall, which will be coupled in order to deduce the impact of climate on the mutation of steppe vegetation. The methodology followed, is therefore essentially based on the application of vegetation indices from satellite images for a period of 21 years (2000, 2001, 2010, 2011, 2000, and 2021). for the two seasons, the results of which show the fluctuation of the plant cover, which could go from a minimum value in the driest periods to quite significant values in fairly rainy periods. These results, therefore, reflect the significant impact of climate change on the fodder availability of pastures. Thus, the spatial analysis of changes in steppe rangelands and forage resources is considered an essential step for the protection of natural resources and also makes it possible to determine the state of vegetation under the effect of climate.

Keywords: satellite images, vegetation indices, rainfall, multi-time series, steppe zone.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Session 6:

Theme 08: Water management in the steppes

Specific degradation in a Mediterranean stream: case of Oued Zeddine (Algeria)

ELAHCENE Omar ⁽¹⁾, DIFI Mohamed Lamine ⁽¹⁾, BOULEKNAFET Zohir ⁽¹⁾, AIDOUZ Aziouz ⁽²⁾, KHADRI Samira ⁽¹⁾

⁽¹⁾ Ziane Achour University, Djelfa, Algeria

⁽²⁾ M'Hamed Bougara University, Boumerdès, Algeria

o.elahcene@univ-djelfa.dz

ABSTRACT

Arid and semi-arid areas are characterized by a differentiation in weather conditions, sometimes the rains are rare and not very intense and at other times they are dense and very intense, which results in torrents that often lead to a strong soil erosion. Most of the time, losses occur at the solids level, because the erosion effect is too high.

This study is based on the estimation of the transfer of solid sediments in the Oued Zeddine basin (Ain Defla, Algeria). To understand the evolution of solid transport as a function of liquid transport, we relied on the use of data obtained in real time of liquid transport and the concentrations of sediment transported in the stream. The results obtained showed that there is a good correlation between the solid flow and the liquid flow with a correlation coefficient estimated at : $R = 0.90$ % with average annual sediment contributions recorded at the outlet of the watershed. Oued Zeddine were estimated at approximately 88.047.92 tons, which corresponds to an erosion rate of 202.41 tons/km².year.

Keywords: concentrations, solid flow, liquid flow, oued zeddine, semi-arid zone, Algeria.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Enhancing Plant Growth and Soil Moisture with Biopolymeric Encapsulation of plant Growth promoting Bacteria from Arid-Adapted *Medicago sativa*

Bouherama A.*¹, Djouadi S.¹, Khedim T.¹, Abderrezzak A.¹, Friuli M.² and Demitri C.²

¹Biology and physiology of Organisms, Biology Science Faculty/ University of Science and Technology Houari Boumediene, Algeria

²Biomaterials Science Laboratory, Department of innovation engineering, University del Salento, Italy

*minabouhrama@gmail.com

ABSTRACT

The Mediterranean basin is one of the regions in the world most vulnerable to climate changes, as well as one of the most impacted by human water demand. In particular, water scarcity affects hydrologic resources, biodiversity, water quality with a direct impact on economic sectors such as industry, energy, transport and agriculture. In the last case, without water people do not have a means of watering their agriculture production and to provide food for the fast-growing population. According to the International Water Management Institute, agriculture, which accounts for about 70% of global water withdrawals, is constantly competing with domestic, industrial and environmental uses for a scarce water supply. Nowadays, many of the irrigation systems do not use the water in the most efficient way. This causes more water than necessary to be used or for there not to be enough water to ensure healthy crops. In this study, we present a novel approach for water management, where bacteria known for their plant growth-promoting properties are encapsulated within biopolymeric matrices. These biopolymers serve a dual function: firstly, as carriers for beneficial bacteria, facilitating their controlled release into the rhizosphere to promote plant growth and health; secondly, as water-absorbing materials, functioning as underground reservoirs to augment soil water capacity and enhance water economy. Bacteria were isolated from *Medicago sativa* plants cultivated in the arid region of El Menea. The isolated strains were evaluated for their potential to enhance plant growth through a series of assays including nitrogen fixation, phosphate solubilization, antagonist activity. Following the identification and characterization of the most promising bacterial strains, a biopolymer was developed to encapsulate these bacteria. The encapsulation process aimed to stabilize the bacteria and facilitate their sustained release into the soil. The biopolymers containing the encapsulated bacteria were then tested under laboratory conditions to assess their efficacy in supporting plant growth. This involved applying the biopolymer-bacteria formulations to plants grown in controlled settings to monitor their impact on plant health and soil water retention capabilities. The results from these experiments were intended to validate the use of biopolymeric encapsulation as a viable method for enhancing plant growth and soil moisture management in arid environments.

Keywords: Water management, water soil capacity, plant growth, beneficial bacteria, biopolymer

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

COMPARATIVE PERFORMANCE OF GENERALIZED REGRESSION NEURAL NETWORK AND ADAPTIVE NEURO-FUZZY INFERENCE SYSTEM MODELS FOR EVAPOTRANSPIRATION ESTIMATION IN DJELFA, ALGERIA

Assia MEZIANI^{1*}, Abdelmonem MILOUDI², Mohammed and SAYAH LAMBAREK³

^{1,2,3}Hydraulic and Civil engineering Department, Faculty of technology, University of El-Oued, Algeria.

^{1,2,3}New Technology and Local Development Laboratory, University of El-Oued, Algeria.

*assia-meziani@univ-eloued.dz

ABSTRACT

Evapotranspiration (ET) is a critical component of the hydrological cycle, representing the sum of evaporation from the soil and transpiration from plants. Accurate estimation of ET is essential for effective water resource management, particularly in arid regions where water scarcity is a significant concern. The models that estimate ET using readily available meteorological data and those based on FAO-56 method gained popularity. Among these models, the Generalized Regression Neural Network (GRNN) and the Adaptive Neuro-Fuzzy Inference System (ANFIS) are widely used due to their ability to handle complex, nonlinear relationships between inputs and outputs. In this study, we compare the performance of GRNN and ANFIS models for estimating ET in the arid region of Djelfa, Algeria. By evaluating these models, we aim to determine the most accurate and reliable method for ET estimation in this challenging environment. The ANFIS model demonstrated moderate accuracy with RMSE values of 0.737, 0.650, and 0.698, and MAE values of 0.483, 0.438, and 0.462 for training, validation, and testing, respectively. Its R^2 and NSE values consistently around 0.904 to 0.919 indicate a strong correlation and good predictive performance. However, the GRNN model significantly outperformed ANFIS, achieving much lower RMSE values of 0.270, 0.222, and 0.217, and MAE values of 0.192, 0.147, and 0.145 across the same phases. The GRNN's R^2 and NSE values were exceptionally high at 0.987 to 0.991, reflecting nearly perfect fit and predictive accuracy. Additionally, the GRNN's lower RSR values and higher Willmott's index further underscore its superior performance, making it a more precise and reliable tool for evapotranspiration estimation in the arid region of Djelfa, Algeria.

Keywords: Evapotranspiration (FAO-56)-Estimation-GRNN-ANFIS- Arid – Djelfa-Algeria.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Estimating of water demand in semi-arid regions, a case study Djelfa city, what are future scenarios?

Ahmed Saidani^{1*}, Fatima Tahraoui¹, Tayeb Tichoudad²

^{1*} PhD student, Email: asaidani11@gmail.com, ¹ Lecturer A
Geography Department, Oran2 University, and Research Laboratory EGEAT, Oran 2 University, Oran,
Algeria

² Lecturer B, Urban Planning Department, Djelfa University, Algeria

ABSTRACT

Algeria's steppe regions are exposed to hydric stress due to the rapid increase in population, offset by growth in agricultural, industrial and service activities, with the growing phenomenon of climate change and the intensification of drought, which has led to an imbalance between available water resources and the increasing demand for them. The city of Djelfa, like the rest of the cities of the steppe region, depends mainly on managing its water needs using groundwater resources, as the attainment these resources and exploiting them in a sustainable manner is considered the most important bet and the biggest challenge for actors in the medium and long term, while preserving the steppe environment with all its fragile components. Controlling supply and demand is also considered an essential element in the social and economic balance, as it enables us to overcome the state of water scarcity in a way that ensures water saturation. With a population exceeding half a million people for the year 2024, we will need 80,000 m³/day if we take into account the theoretical standard set by the Directorate of Water Resources of Djelfa is 160 liters/per capita/day. Knowing how to use, preserve and develop water resources is the core of this research with the identification of the water gap in supply and demand with the lack of supply, as it is not possible to understand the relationship between demand and supply without understanding and analyzing the reality of the water supply of the city of Djelfa with regard to uses (urban, industrial and agricultural). In this paper, we will highlight the current conditions of water supply to the city of Djelfa with a diagnosis of future ways and scenarios to overcome water scarcity in the medium and long term for the year 2050.

Keywords: (Djelfa city, Algeria's steppe, hydric stress, drought, increase of demand, groundwater management).

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Session 7 Virtual Poster Flash Talks

APPROACHES TO THE DEVELOPMENT OF LOCAL COMMUNITY RESILIENCE ALONG WITH THE SUSTAINABLE CONSERVATION OF WETLANDS: LESSONS LEARNED FROM IRAN

Daryaei NAJMEH¹, Pirmoradi AMIRHOSSEIN²

¹PhD in Agricultural Development and Sustainability Researcher and Specialist, Science and Research Branch, Islamic Azad University, Tehran, Iran (n.daryaei2007@gmail.com, n.daryaei@srbiau.ac.ir)

²PhD in Agricultural Development, Department of Extension and Education of Agriculture, Razi University, Kermanshah, Iran

ABSTRACT

Nowadays, wetlands are under increasing pressure caused by population growth, poverty, economic inequalities, social and economic conflicts between local communities, and unsustainable exploitation of plant and animal resources. Wetlands, as one of the basic environmental resources, due to being located in the lowest parts of watersheds, are usually affected by most of the upstream changes and developments, which cause problems such as the reduction of water entering the wetlands from the surface and underground water sources of the basin. watershed and plains around the wetlands (lack of environmental protection of wetlands), especially due to the implementation of dam construction and inter-basin transfer projects, destruction and sedimentation of wetlands, pollution caused by urban, industrial, and agricultural activities, unsustainable exploitation of the flora and fauna species of the wetland, especially the illegal and indiscriminate hunting and harvesting of fodder and other wetland products, exceed the renewable capacity of the wetland, the development of unsustainable activities in the wetlands and the entry of non-native and invasive species into the wetlands.

Resilience is a relatively new concept that refers to the capacity and ability of a society or ecosystem to change and resist stress, trying to survive, adapt, and successfully pass a crisis or disaster. Developing the resilience of the local community, which hosts one of the most significant human natural resources, i.e. wetlands, always has a special role in their wise conservation and management. This study, from an expert's point of view, investigates the development approaches of the local community from economic and social dimensions in three target wetlands in Iran, including Fereydoon Kenar International Wetland in the North, Hamoun International Wetland Complex in the East, and Zaribar Wetland in the West of Iran.

The development of resilient and sustainable tourism relies on the local community capacities, the development of regional and value-creating handicrafts, and the improvement of the resilience of local communities around wetlands through the promotion of birdwatching, which is among the fruitful approaches proposed in this study.

Keywords: Resilience Development, Sustainable Conservation, Wetlands, Iran.



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Combating the Soils Desertification in EU

Dr. Kakha NADIRADZE Chair DesertNET International

ABSTRACT

The negative effect of global climate change and related consequences on desertification is complex problem and not yet adequately understood. On the one hand, higher temperatures resulting from increased carbon dioxide (CO₂) levels can have a negative impact through increased loss of water from soil and reduced rainfall in drylands. On the other hand, for certain species, an increase in carbon dioxide in the atmosphere can boost plant growth and Soils are radically degraded and eroded because of the drought, over flooding, over grazing and declining of soils microbiota.

In the extreme south of France, as in the entire western Mediterranean basin, drought has established itself. Weather data is unlikely to ease general concerns. "Twenty-two months of rainfall deficit since the start of 2022: The Eastern Pyrenees region is experiencing a drought of historic duration and intensity, the worst since records began in 1959," said Simon Mittelberger, a climatologist at Météo-France, the national forecaster. "The winter of 2023-24 was even drier than the previous one, recording a deficit of 55%."

Across North Africa to Italy, through the Algarve in southern Portugal, along the entire east coast of Spain, including the Balearic Islands, the far south of France, Sicily, Sardinia, Malta and extending to Crete, the situation is clear: the current situation is not the result of an exceptional episode associated with record-breaking temperatures - although the last three months stand out as the warmest winter ever recorded in the world - are more of a long-term phenomenon.

Based on the above, we make recommendations to the NGO Leaders, Researchers and scientists to be aimed at better understanding land degradation and desertification assessing the need to enhance Soils Restoration bet practices and availability of legal framework for soil; and stepping up efforts towards delivering the commitment made by the EU and the Member States to achieve land degradation neutrality in the EU by 2030.

Keywords: Soils, Desertification, EU.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Possible Development Options of Water Resources in Palestine

Eng. Deeb Abdelghafour*

* Water Resources Expert – Office of Quartet, West Bank,
E-mail: deeb_saleh2003@yahoo.com.

ABSTRACT

More than 95 percent of Palestinian water supplies for domestic, agricultural, and municipal and industrial use come from groundwater, either in the form of wells or springs. The fact that the Palestinian water supply consists almost exclusively of groundwater highlights the extreme importance to develop additional water quantities to overcome the water scarcity problem. Palestine is vulnerable within its geopolitical setting, where access to water has been an issue within the context of the Israeli-Palestinian conflict for long decades. As result of the 1967 war, Israel controls all water resources and exploiting over 85% of shared groundwater resources. This injustice and inequitable allocation of water has seriously deteriorated the overall economic and social well-being of the Palestinian people and forced the Palestinians to look after developing other options. During the past 20 years, several development options have considered to improve water supply rates in Palestinian communities. These options clustered in three main categories:

- 1- Developing additional water resources through drilling new production wells, rehabilitation of existing wells and springs, purchasing water, harvesting of surface runoff, treating the wastewater and reuse, developing several RO desalination units for brackish and seawater
- 2- Demand management to enhance water efficiency and promoting water-saving behaviors through water-saving, minimizing water losses and leakages, prepaid meters, rehabilitation of water infrastructure, implementing water tariffs and institutions reform.
- 3- Adopting smart technologies through enabling the real-time monitoring of water resources (quantity and quality), advancing the green energy in operation of water facilities to reduce the water costs and smart irrigation technologies.

In conclusion, water development options in Palestine still facing significant challenges related to securing the needed permits from Israeli occupation, securing the needed fund for the developmental projects, and climate change. However, it is essential to address challenges related to data availability, infrastructure investment, capacity building, and stakeholder engagement to realize the full potential of water development options.

Keywords: Development, Water Resources, Palestine.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Study of rainfall trends and drought: case of a watershed in eastern Algeria

Cheikh Bergane^{1*}

^{1*} Laboratoire de Rhéologie, Transport et Traitement des Fluides Complexes (LRTTFC), Département d'Hydraulique, Faculté d'Architecture et de Génie Civil (FAGC), Université des Sciences et la Technologie d'Oran -Mohamed Boudiaf- (USTO-MB), Algeria

*cheikh.bergane@univ-usto.dz

ABSTRACT

Drought is a natural hazard with complex impacts that affect various sectors of the economy, such as water resources, agriculture, and natural ecosystems. This study aims to analyze climate change on an annual scale by examining trends and shifts in rainfall series using non-parametric statistical tests, including the Mann-Kendall (MK) test and Pettitt's test. Additionally, the study assesses meteorological drought using the Standardized Precipitation Index (SPI) and the Modified Fournier Index (MFI). The study area encompasses 14 meteorological stations across two endorheic basins located in eastern Algeria. The results of the Mann-Kendall test indicate that most stations show no significant trend over time, suggesting a relative stability in observed rainfall. However, upward trends are observed at stations 70305 and 70707, while station 70308 exhibits a downward trend. Pettitt's test reveals that most stations did not experience a significant shift in their precipitation data, except for station 70707, where a change was identified in 1995, associated with a 39.93% increase in precipitation. The analysis of the Modified Fournier Index (MFI) results shows that most stations display values corresponding to a "regular" classification, suggesting a relatively even distribution of precipitation events without a marked tendency for significant seasonal variations. The results for the percentage occurrence of different drought categories reveal a diversity in the climatic conditions of the study area, with the most frequently observed category being "near normal." These findings are consistent with the results of the Mann-Kendall test. The years 1983 and 1987 stand out with the highest percentages for very dry and moderately dry conditions, respectively, with 1983 associated with extremely dry conditions. A comparison of the three decades (1972-1981, 1982-1991, and 1992-2001) suggests that the study period can be divided into three phases: a period characterized by relatively stable and moderate climate, followed by a wetter phase, and then a return to climatic stability with a slight trend toward drier conditions.

Keywords: Rainfall trends; meteorological drought; East Algeria; SPI; MFI.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Contribution to the study of the toxic effect of organophosphate pesticides on some Gram-negative bacteria (*Enterobacteriaceae* and *Pseudomonadaceae*).

Hantache Rabhia¹, Melliani Amina² and Kkelkhal Khedidja³

^{1,2,3}Affiliation [departement of biological sciences faculty of natural and life sciences, University of Mustapha Stambouli, Mascara, Algeria]
hantacherabhia2020@gmail.com

ABSTRACT

The scientific community remains increasingly concerned about the health with the use of plant production products, whether directly or indirectly. Most studies, however, suffer from imprecision in exposure to pesticides and an underestimation of the health problems associated with their use. Through this contribution, we are trying to study the existing interaction between an organophosphate pesticide (chloropyrifos-ethyl) widely used in Algeria and a bacterial model. The main objective was to aim and apply the right dose to a given target with complete safety and health vigilance. Given the confinement conditions, the study model on seven bacterial species belonging to *Enterobacteriaceae* and *Pseudomonadaceae* and not to rats. On the one hand, to study this interaction and on the other hand to exploit them in the degradation of any chemical residues generated. This interaction was demonstrated by infrared spectroscopy (FTIR). The results obtained showed that the bacterial growth of *Pseudomonadaceae* with the pesticide was more significant in organic medium (LB) vis-à-vis *Enterobacteriaceae* which preferred a mineral medium (MSMN). Very marked resistance with increasing exposure concentrations. FTIR results indicated the presence of absorption bands between 3327.57 and 3336.82 cm⁻¹ relating to the vibration of the C-H bond and other bonds for *E. coli*, *P. aeruginosa* and *P. fluorescens* strains.

In view of these results, it seems clear that these species really have a potential catalyst for metabolizing this organophosphorus pesticide (C₉H₁₁Cl₃NO₃PS).

Keywords : Risks, organophosphate pesticide, Bacteria, Interaction, FTIR.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Abstracts of Poster presentations

Poster Session A

THE ADVANCE OF THE OLIVE GROVE IN THE STEPPE PLATEAU OF SOUTHEASTERN ANDALUSIA

Sánchez-Martínez, J. D.^{1(*)}, and Garrido-Almonacid, A.²

¹Department of Anthropology, Geography and History, University of Jaén, Spain

²Department of Engineering Cartography, University of Jaén, Spain

*jdsanhe@ujaen.es

ABSTRACT

In the lee of the Betic Cordilleras, around the coordinates 37° N and 3° W, the Andalusian steppe zones form one of the most original geographies of the Iberian Peninsula. In addition to the landscape and biogeographical interest imposed by the aridity, this territory stands out for its economic and demographic decline observed during the last decades. In this context, there is an accelerated transformation of agricultural land use and, in particular, the advance of woody crops over herbaceous crops. Thus, a more generalized process of productive specialization -and intensification whenever possible- and simplification of the landscape is taking shape locally, as opposed to the diversity, complementarity of uses and formation of mosaics that were typical of the traditional agricultural model. These behaviors are consubstantial with those experienced by the population and settlements, which have suffered more the greater the rural condition of the municipalities. The treatment of georeferenced information from different historical moments (four chronological cuts have been made that coincide with decisive moments from the territorial point of view, such as 1875, 1956, 1999 and 2023), is the basis for locating and accurately characterizing the different pace and spatial pattern of this process of change. The analysis of the factors that have driven it, as well as the consequences derived from the current situation, give way to the discussion of its sustainability. An aspect of special relevance, especially if we consider that the area clearly reflects an increase in temperatures and a decrease in rainfall, is that related to the management of water resources and, from there, the contrasting survival options observed between dry and irrigated lands. The scope of the study IS limited to several municipalities in the province of Jaén, where the olive grove is the almost absolute protagonist of the new landscapes superimposed on soils that until a few years ago were mainly used for dry cereal crops.

Keywords: de population, desertification, hydrological planning, olive groves, land use, rural landscapes.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

The evaluation measures of projects aimed at combating soil degradation in the Algerian steppe and the intelligence in selecting measurement indicators based on the criteria of coherence, relevance, effectiveness, impact, and efficiency

OMRANI Rachid^{1*}, BENABDERRAHMEN ALI^{1**}, CHEKALI Ahmed Nadjib^{2***}

¹Faculty of Natural and Life Sciences / Ziane Achour University of Djelfa

*r.omrani@univ-djelfa.dz.

**benabderrahmanali@yahoo.fr

Faculty of Civil Engineering and Architectural Technology / Amar Telidji University, Laghouat

***chakahmed@gmail.com

ABSTRACT

In the Algerian steppe, the ecosystem is facing increasing degradation of its vegetation cover, threatening its biodiversity and ecological and bioclimatic resilience. This degradation results from factors such as the overexploitation of natural resources, overgrazing, climate change, and deforestation, particularly in recent years.

This phenomenon, with harmful consequences for both the environment and local populations, requires urgent and effective action. Among the essential tools for the success of these actions, the judicious selection of measurement indicators proves crucial.

Soil degradation in the Algerian steppe is a major ecological issue that threatens biodiversity, water resources, and the viability of local communities. To address this threat and combat this phenomenon, various soil conservation and ecological rehabilitation projects have been implemented since 2003 by public authorities. These projects, though commendable, struggle to fully demonstrate their effectiveness. Indeed, the evaluation methods in place appear insufficient, and the results obtained thus far have not reassured stakeholders about the sustainability of these anti-desertification programs and the development of the steppe.

This study presents a comprehensive and in-depth evaluation of an environmental project involving dune stabilization, the construction of micro-dams, and pastoral planting. The analysis focuses on five key evaluation criteria: coherence, relevance, effectiveness, impact, and efficiency, accompanied by specific indicators to measure the project's performance. The detailed evaluation shows that, although the project generally meets its objectives, there are challenges in optimizing resources, maximizing long-term impact, and improving socio-economic outcomes for beneficiaries. The multidimensional approach helps identify not only the project's strengths but also areas for improvement necessary to ensure its sustainability.

The use of satellite imagery in evaluating projects aimed at combating soil degradation in the steppe also allows for efficient monitoring of environmental changes, measuring the impact of interventions, and adjusting strategies accordingly. In this study, this approach offers a comprehensive and accurate view of soil dynamics, thereby facilitating the implementation of sustainable and effective restoration projects.

Keywords: Steppe, degradation, soil, indicators, development, sustainability, satellite imagery.



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

CONTRIBUTION OF PRECIPITATION AND CEREAL CULTURES IN DJELFA PROVINCE: CASE STUDY

TICHOUDAD TAYEB

University of Djelfa, mail: tichoudadt@gmail.com, phone: 0699289938

ABSTRACT

Cereal farming in the steppe zone is very dependent on climatic conditions subject to very frequent droughts and experiences very marked climatic variability in the cereal growing in some municipalities of Djelfa province contributes to the improvement of the economic situation of the population.

This study aims to research the correlation exists between cereal yield and the quantity of annual and monthly precipitation. This is very important work which will make it possible to identify the dependence between climate and agriculture, based both on developed statistical methods and then on thematic mapping of results obtained.

The soil of the study area is good for growing grains, especially in the northern part of the state, and in order to raise the yield of one hectare of grains annually, the state must intervene in several aspects, including exploiting groundwater, encouraging irrigated crops, facilitating access to electrical energy, especially solar energy, and providing and supplying Providing farmers with fertile fertilizers, accompanying farmers and encouraging investment in grain cultivation.

Facilitating loans from banks and modernizing agricultural machinery will increase the amount of grain crops from year to year in the future The result is that the contribution of rain-fed agriculture is weak, requiring direct state intervention in the agricultural sector in this state.

Keywords: Climate, precipitations, cereal culture, cereal yield, correlation.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

FACTORS OF DEGRADATION OF THE ATLAS PISTACHIO (*PISTACIA ATLANTICA*) IN THE ALGERIAN STEPPE

Yasmina SMAILI¹, Safia BELHADJ² and Djamila MADANI¹

¹Département Of Agronomic Sciences, Faculty Of Nature And Life Sciences, Mohamed Boudiaf
University, Algeria

¹Département Of Agro-vétérinaire Sciences, Faculty Of Nature And Life Sciences, Ziane Achour
University, Algeria

yasmina.smaili@univ-msila.dz

ABSTRACT

Algeria, among the countries on the southern shore of the Mediterranean basin, is one of the foremost directly concerned with the conservation of biodiversity in the steppe region. Impacted by climate change and drought felt year after year, numerous species have seen their range reduced. Among these species is the "Atlas pistachio," which exhibits significant potential. This woody species, "born to resist," has a morpho-physiological profile that ensures effective combat against desertification, and it often plays a role in soil conservation in pastoral steppe regions. Understanding the regeneration problems and degradation factors of the species would contribute to the protection of biodiversity in arid and semi-arid regions. The main objective of this study is to explore the various degradation factors of *P. atlantica* in arid and semi-arid regions. Five populations were studied in this research (Elguerssa, Sidi Ameur, Elhamel, Tamsa, and Sidi M'hamed) in the M'sila region. Based on field surveys, the following factors can be summarized as contributing to the degradation of the species in the study area:

Unregulated exploitation and the use of Atlas pistachio for fodder and its wood for heating; Unauthorized grazing (sheep and cattle herds) that causes the destruction of jujube (*Ziziphus lotus*) clumps and prevents the natural regeneration of the species; The construction of roads within the daïas, which requires the removal of several individuals; Poor health of the trees; The use of the tree trunk as beehives (apiculture); The legal status of the lands (Melek or Wakef) preventing forest conservation interventions for the preservation and protection of the species (case of Dayat Sidi M'hamed); Natural factors, such as water and wind erosion, and aging of the trees; Cereal farming and plowing (the destruction of young individuals preventing their regeneration).

This species is part of the natural resources in the region, and for this reason, it is necessary to safeguard and enhance it. It serves as an excellent barrier against the encroachment of the desert. Its rehabilitation and conservation are therefore essential to contribute to the sustainable development of arid and semi-arid areas.

Keywords: *Pistacia atlantica*, degradation, natural and anthropogenic factors, steppe, M'sila.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Determining the spatial and temporal distribution of drought within the Algerian steppe to prove climate change

ATTOU Alaa eddine¹, ZAHED Khalid¹, AZOUZI Blel¹

¹University of Ziane Achour - Djelfa - Faculty of Science of Nature and Life - Department of Agronomy - Laboratory of EVSE, P.O. Box 3117, Cité Aîn Chih, 17000 Djelfa, Algeria

*Adresse e-mail: attoualadin@gmail.com

ABSTRACT

As an aspect associated with **climate change**, drought has become a major challenge in various parts of the world, especially in areas where life depends mainly on rain-fed agriculture.

This contribution aims to identify and study the areas most vulnerable to drought in the study area, both temporally and spatially.

The Standardized Precipitation Index (**SPI**) was calculated annually for 41 years for 50 stations in the Algerian steppe region. Based on the **Kriging** statistical method, **GIS** was used to draw digital maps defining the spatial distribution and extent of drought on SPI values in the area.

The results showed that the steppe region witnessed drought waves of varying intensity and impact on 50 stations, with the drought trend extending from south to north in descending order. This drought was observed in three regions:

Severe drought category (**S-E**) with values from -1.5 to -2 on the SPI scale in the southwest and south-central.

Near-normal drought category (**Normal**) with values from -0.99 to -0.99 on the SPI scale in the central regions from east to west.

Moderately humid drought category (**M-H**) with values from 1 to 1.4 on the SPI scale in the northern and northeastern regions.

Drought is often normal in the Algerian steppe region, but the northern and central-eastern regions are considered the best areas for agriculture if water sources are available.

Keywords: (Drought; Meteorology; SPI, Kriging; GIS; Steppe.).

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Studying evapotranspiration spatially within the Algerian steppes using geographic information systems to determine climate change.

ZAHED KHALID^{1,2}, ATTOU ALAA EDDINE^{1,2*} and AZOUZI BLEL¹

¹Faculty of Nature and Life Science - Department of Agronomy
²Laboratory of EVES, P.O. Box 3117, Cité Aïn Chih, 17000 Djelfa,
University of Ziane Achour - Djelfa - Algeria

*a.attou@univ-djelfa.dz

ABSTRACT

Algeria was interested in the agricultural field at the beginning of the eighties, so it was necessary to evaluate the climatic suitability within the region and determine the impact of climate change within the region. Since the study area is of a steppe nature and most of its agricultural activity depends on rain. This study was adopted to determine plants' water needs and determine the distribution of plant **evapotranspiration** within the study area.

The monthly potential **evapotranspiration** was calculated for 50 stations in 4 seasons (autumn, winter, spring, and summer), using the **Thornthwaite** equation and choosing the period 1981-2019 to study this phenomenon. It used a **GIS** to draw numerical maps that determine the spatial distribution of potential **evapotranspiration** for each season within the steppe based on the statistical **Kriging** method. Evaporation was the lowest value in the western regions of the steppes, with a value of 0.129 mm/month and its value increased towards the east over the four seasons. It peaked during summer at 0.51mm/month and reached its lowest value during fall and winter at 0.126 mm/month, with a gradual increase in the spring on the field of 0.36 to 0.46mm/month. It is possible to rely on steppe cultivation in seasons with a lower **ETM** value while monitoring plant stress to increase the crop's water requirements.

Keywords: ETM, GIS, Kriging, steppe, Thornthwaite.



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Study of the hydrological response of the Soummam watershed In the North East of Algeria

Dr SAHLI Y. ^a, Pr MADANI K. ^b

^aLaboratory of Water, Environment and Renewable Energy, Faculty of Technology, University of M'sila, Algeria.

^bLaboratory of Biomathématique Biophysique Biochimie and Scientométrie, Faculty of Sciences of Nature and Vie, University A. Mira of Bejaia, Algeria.

Abstract

The study on the hydrological response at the local scale (Soummam watershed) is an attempt to respond to our concern which is the “water management of tomorrow”, given climate change and the anthropogenic effect of the latter decade in this region. Climatic conditions in a watershed play a key role in the hydrological behavior of watercourses.

The main objective of this study is to determine the hydrological functioning of the overall Soummam watershed and its sub-watersheds at nested scales, using data from available hydrometric stations and data from corresponding rainfall stations. See below the rainfall-flow and flow-flow response at several scales, in order to see the climatic and anthropic influence on the response of the Soummam watershed in North-East Algeria.

Keywords: watershed-rainfall-flow-climate-hydrological response.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Climatic Drought, a Challenge to the Steppe Ecosystem and Vegetation of Djelfa

Boubakeur Guesmi

Zian Achour University of Djelfa-ALGERIA

aboubakeurscience@gmail.com

ABSTRACT

Under the context of desertification, the climatic drought makes a real problem and challenge against the sustainable development of the Algerian steppe. In fact, this steppe is of a paramount importance by making a defensive rampart against the advance of desert to the Northern fertile lands in both Algeria and all of African continent. Therefore, analyses of the rainfall data for the last 42 years in Djelfa by the coefficient of variation CV, the precipitation concentration index PCI, simple linear regression, Mann Kendall test, Sen's slope and homogeneity tests have revealed a drastic variability for both monthly and annual rainfall from year to another with no seasonality, namely a strong hydric stress would threaten plants subsistence and cause summer flood which destroys soil. Moreover, an annual decreasing was due to almost all months decreases particularly winter and spring. However, August, September and October recorded slight increases to let expect an eventual autumnal advance in August instead of September. This goes along with trend results whose the maximal decreasing trend was in November, then January. However, the increasing trend was the most in August, then July. In fact, the significant decreases were due in part to the abrupt decreases almost in winter then spring. Unequivocally, within the context of the desertification threat, this drought and drastic hydric stress make a real challenge to pastor whose production depends only on rainfall.

Key words: Climate change, Sustainable development, Mann Kendall, Sen's slope, Coefficient of variation (CV), Precipitation concentration index (PCI).

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

CLIMATE CHANGE IN ARID AND SEMI-ARID AREAS: COMPARATIVE STUDY OF ITS IMPACTS ON WATER RESOURCES IN THE MENIA AND DJELFA REGIONS

FOUFOU A.^{1*}, AZLAOUI M.², HAIED N.¹, BOUSSAID A.¹

¹Earth & universe sciences Department, Nature & life sciences Faculty, University of Djelfa, PO Box 3117, Djelfa 17000, Algeria.

²Hydraulics Department, Technical Sciences Faculty, University of Djelfa, PO Box 3117, Djelfa 17000, Algeria.

at.foufou@univ-djelfa.dz

ABSTRACT

This work addresses the problem of climate change in arid and semi-arid areas. The region of Djelfa is located in the high steppe plains of Algeria, which is characterized by a semi-arid climate with a low rate of precipitation. It faces significant water needs and a local shortage of groundwater and surface water. Located in the southern Saharan region of Algeria, the region of Menia has an arid climate with a very low rate of precipitation and extreme temperatures. It is facing significant water needs, despite the presence of large amounts of groundwater although without any surface water supply. Thus, since climate factors have a significant influence on the water balance, it is essential to understand and analyze their consequences in order to ensure optimal management in such situations. The analysis of meteorological drought using the SPI and the RDI indices at Djelfa, Ain Oussera stations throughout the study period, from 1981 to 2021 and Menia station during the 1991 to 2022 revealed significant variations in the climate regime, with a predominance of dry fluctuations. For Djelfa and Ain Oussera, with regard to the drought severity, the SPI index indicates the same severity during each drought period while the RDI indicates a slightly weaker severity. The RDI is more precise in terms of the number of drought months than the SPI, because it is more suitable for semi-arid regions. For Menia, regarding the severity of the drought, the SPI and RDI indices show the same severity in each drought period. The region has periods of recurring drought every two years, lasting between two and three years, varying between moderate and extreme drought severity in such arid climate.

Keywords: Climate Change, Drought, Severity, Water, Algeria, SPI, RDI.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Impact of climate change on the development of halophytes in the western part of Algeria

Kerzabi Rachida^{1*}, Boussaid Khadidja¹, Lafri imène¹, Boublenza Ibtissem², Bekkouche Assia³, Zaoui Aicha⁴ Merzouk Abdessamad⁵

¹ Research Center in Agropastoralism (CRAPast) - Djelfa

² Higher School of Agronomy (ESAM) - Mostaganem

³ Salhi Ahmed University Center - NAAMA

⁴ Ziane Achour University - Djelfa

⁵ Laboratory of Ecology and Management of Natural Ecosystems (LECGEN) - University of Abu Bekr Belkaid – Tlemcen

*didou_rach@yahoo.fr

ABSTRACT

In recent decades, there has been a particular focus on the study of flora, including its biological, chronological, and ecological characteristics, as well as its adaptation to climate fluctuations and the influence of human activities. Vegetation, in general, in the Tlemcen region is shrinking in surface area; this intense degradation is largely due to a combined action of humans and the climate. **Atriplex formations** are considered a valuable tool in the management of arid and semi-arid zones. Several floristic studies have been conducted to better understand these environments occupied by halophytic taxa.

Climate change, in general, is increasingly becoming a constraint on the growth and development of plant species in their environment, especially in semi-arid and arid regions.

The impact of bioclimatic factors on the **Atriplex formations** in the Tlemcen region led us to analyze the bioclimatic environment using climatic data recorded from six stations over two periods: an older period (1913-1938), obtained from the meteorological collection of Seltzer, 1946, and a more recent one (1985-2010), obtained from the meteorological station of the ONM (National Meteorological Office).

The aim of this study is to highlight a close comparison between these two periods in the study area and to specify the evolution of vegetation according to climatic gradients. We were able to show that between $Q_2 = 63.97$ in the north and 17.72 in the southern zone, the climagram obtained confirms that **Atriplex** grows in almost all bioclimatic zones: Mediterranean, sub-humid, arid, upper, and lower semi-arid levels.

Keywords: Flora – Climatic factors – Semi-arid – Atriplex formations – Bioclimatic level.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Assessment of Pollution Dispersion and Climate Impacts from Industrial Activities in Sensitive Steppe Environment

HENNANE Sarra¹, HAMOU Ahmed^{2*}

¹Department of Chemical Engineering, Faculty of Chemistry, University of Science and Technology of Oran
Mohamed Boudiaf, Algeria

^{1,2}Laboratory of Environmental Science and Material Studies, University Oran1, Algeria

sarra.hennane@univ-usto.dz

ABSTRACT

This study aims to examine the dispersion phenomenon of pollutants emitted by gas treatment and compression facilities, as well as pipelines that connect the study area of Hassi R'Mel to various national and international destinations. The objective is to conduct a quantitative evaluation of the gaseous effluents emitted by the gas facilities in the major industrial zone of Hassi R'Mel, located in the Laghouat province, and to assess the climate impacts on the region. This site is one of Algeria's largest gas fields and serves as a strategic hub for the transport and distribution of natural gas across the country and to Europe.

Algeria, as an oil-producing country, has consistently addressed environmental issues. A National Climate Plan (PNC) for the 2020-2030 period was presented by the Ministry of Environment and Renewable Energies at the "Climate Action Summit 2019," held on September 23, 2019, in New York. This plan aims to reduce GHG emissions by 22% as a conditional commitment and by 7% as a voluntary commitment, as announced at the Paris Climate Summit (COP21) in 2015.

The climate impacts are multifaceted: rising temperatures, accelerated desertification, reduction of vegetation cover, and disruption of hydrological cycles. These changes directly threaten agriculture and livestock, the main economic activities of the local populations, and exacerbate soil erosion. The evaluation of gaseous effluents in steppe regions is therefore crucial for developing emission reduction strategies, promoting sustainable practices, and protecting this ecosystem against the effects of climate change.

Keywords: Air pollution, gaseous effluents, environment, climate impact.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

The implementation of public and landscaped green spaces in new Algerian steppe towns, case of Boughzoul (Algeria)

TRODI F.*

*Earth and Universe Sciences Department, Faculty of Nature and Life Sciences, University of Djelfa,
(Algeria).
ftrodi2000@yahoo.fr

ABSTRACT

The implementation of public and landscaped green space projects developed by designers, including urban planners, planners, architects, landscapers, spatial designers and contractors, is increasingly attracting the various institutional actors involved in land use planning in Algeria. The major urban projects adopted, such as the Bay of Algiers, the maritime fringe of Oran, or even territorial projects such as the Green Dam and the East-West motorway, are examples of the interest shown by stakeholders. Thus, our intervention focuses on the analysis of the implementation of these designs in the territory dedicated to the new town of Boughzoul, situated midway between Algiers and Djelfa in a steppe region with an arid climate. The city project initially planned for 350,000 inhabitants by 2030 over an area of 6,000 ha, has been designed to become a model of a sustainable ecological city integrated into the country's urban framework. However, the actual realisation of the urban project (started in 2009) of this city “ex nihilo” in the Algerian steppe did not follow the initial objective of the project owners.

What were the reasons for this? How does this implementation of green public spaces proceed in the absence of other skills in the process, both conceptual and practical of the project (fountain workers, lighting engineers, landscapers, etc.)? Despite this, the new town continues to rise due to the skills whose work we are analysing.

Keywords: New town, Boughzoul, landscaping, public green spaces, arid steppe, Algeria.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

The impact of the degradation of the steppe environment on population changes, the municipalities of Al-Sharif and Al-Idrisiya in the state of Djelfa as an example

HARZLI TAWFIQ

harzeli.tawfiq@univ-oran2.dz

Abdellaoui Belkacem

University of Laghouat, Algeria

Kasimo1781@gmail.com

TICHOUDAD TAYEB

University of Djelfa Algeria

tichoudadt@gmail.com

ABSTRACT

The presented article aims to study and analyze the spatial population movement and highlight the changes taking place in the steppe region in Algeria, related to the deterioration of the steppe environment and its direct repercussions on the urban-rural structure, and on the economic and social structure within its specific temporal and spatial framework. In this regard, the regions of Charf and Al-Idrisiya were chosen from Djelfa Province, as a model for documenting population changes, and as a case worthy of study and analysis.

The official digital data issued by the National Bureau of Statistics (ONS) was adopted in this research and supported by a field study, in which a form was distributed to a sample of the study population (questionnaire) through which valuable information was collected, and the SPSS statistical analysis program was used to analyze it and extract the desired results from it, and then identifying the factors that directly affect the spatial movement of population and are subject to the factor of polarization, the attraction and repulsion in the region.

Taking into account that population stability is a pivotal factor in sustainable development, and helps to develop sectoral development projects for the benefit of the population and exploit available resources on the one hand, and on the other hand to confront the dangers facing the region such as drought, deterioration of pastures, decline in livestock, and desertification. And others.

Keywords: spatial population movement, urban-rural structure, social economic structure, drought, Pasture degradation, desertification).



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Pastoralism in Algeria: An eco-cultural heritage to be preserved for future generations

AZZOUZ Mohamed

University of Djelfa

ABSTRACT

Pastoralism, a traditional way of life deeply rooted in Algeria's history and culture, is a valuable eco-cultural heritage. This ancestral practice, which consists of raising animals by moving with the seasons in search of pastures, plays an essential role not only in the local economy, but also in preserving the environment and cultural traditions.

Livestock farming in the steppic environment makes a significant contribution to Algeria's rural economy. It is of economic and social importance, providing many families with a means of subsistence, and is also an essential source of products such as meat, milk and wool. In addition, the practice helps maintain resilient production systems, adapted to the arid and semi-arid climatic conditions that characterize much of the country.

Roaming in search of natural forage on generally steppe-like rangelands helps conserve biodiversity by keeping ecosystems open and varied. By grazing extensively, the herds contribute to landscape management and fire prevention by reducing plant biomass. This balanced interaction between man and nature contributes to the diversity of plant and animal species.

In addition to these ecological interests, the shepherd's role as animal nutritionist is also the bearer of a rich cultural heritage through the transmission of know-how and traditions. Customary knowledge of animal husbandry, transhumance routes and techniques for the balanced management of natural resources is passed down from generation to generation, from father to son. These inspirations, often oral, constitute an intangible heritage that it is important to preserve.

However, pastoralism in Algeria faces many contemporary challenges. Desertification, shrinking pastures, climate change and increasing urbanization threaten this traditional practice.

To sponsor this eco-cultural heritage, it is necessary to put in place a preservation strategy, support and protection policies. This includes recognizing and valorizing pastoral know-how, promoting sustainable natural resource management practices, and supporting pastoral communities to improve their living conditions. Training and awareness-raising initiatives are also essential to ensure the transmission of traditional knowledge to young pastoralists. In order to register it as universal human heritage with UNESCO. To enhance the value of activities linked to transhumance, nomadism and all craft professions linked to the rural life (tangible and intangible) of pastoral populations.

Keywords: Pastoralism, Algeria, eco-cultural, preserved, future generations.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Micro-regional imbalance of the agglomeration system and urban congestion in the city of Djelfa

RABHI Badreddine

University Ziane Achour-Djelfa, Algeria. B.rabhi@yahoo.fr

BENKHELIF Amar

University Ziane Achour-Djelfa, Algeria. a.benkhelif@yahoo.fr

ABSTRACT

The city of Djelfa suffers from urban congestion. The concentration of the population and especially of the activities of the secondary and tertiary sectors at the level of the chief town of the wilaya attracts a large population. The latter has favored the imbalance of the agglomeration system of the wilaya and consequently the urban congestion of the primatial city. This urban problem is explained by an incoherent development. The agglomeration chief town of the wilaya grows faster than the rest of the agglomerations and takes on disproportionate dimensions compared to the whole. The consequences of this imbalance are multiple, in particular the great pressure on the traffic routes which is due to a significant daily flow of the population towards the primatial city which can no longer meet the needs of its inhabitants. The aim of this research is to demonstrate the relationship between the urban congestion of the primatial city and the micro-regional imbalance of the agglomeration system.

Keyword: agglomeration system, Imbalance, agglomeration system, Djelfa.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Poster Session B

Characterisation of steppe rangelands in the wilaya of EL-BAYADH

Yassine DJELAILA and Saad KHEDIMI

Department of Ecology, Institute of Sciences / Nour Bachir University Centre, El Bayadh, Algeria.
*djelailay@yahoo.fr

ABSTRACT

The steppe is a climatically and geographically specific zone, characterised by the presence of grazing plains and the absence of trees, with the exception of those close to rivers and lakes.

Vegetation cover in steppe areas is a major challenge because of its sensitivity to external factors, which can affect it rapidly.

Using remote sensing satellite images with a very high resolution of 10 m, NDVI and SAVI values were calculated across the whole of the wilaya of El Bayadh over an area of around 71,000 km² with a grid of 1 km² and over two different months, namely May and August, for five consecutive years from 2017 to 2021.

The results revealed some unexpected facts about the vegetation cover in the region, which has become very fragile and is steadily deteriorating.

We found that the category with the best vegetation cover is [0.45, 0.75], which occupies just 0.01% of the total surface area of the wilaya, 8.9 km², which is a very small percentage.

The category [- 0.15, +0.15] occupies 98.9%, 67,080 km². These values mean that the state of health of the plants is significantly low, especially in the last two years, 2020 and 2021.

On the other hand, the area of rangeland put under protection represents only 5.09% of the total area of the wilaya, 350,000 hectares out of 7,100,000 hectares, which means that protection plays a very small or even negligible role in plant regeneration.

Key words: Remote sensing, NDVI, SAVI, vegetation cover.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Contribution to the Study of Mycorrhization in Some Plants from the Pre-desert Region of Algeria

HAMYEME Halima el Saadia ^{1,2*} et MALLEM HAMIDA ^{1,2*}

¹Université AMAR TELIDJI Laghouat, Department of Agronomic Sciences

²Mechanics laboratory: Natural Resources and Environment team

Email: h.hamyeme@lagh-univ.dz

ABSTRACT

Drought and human activities in arid regions exacerbate the risk of degradation of pre-desert rangelands. As we know, mycorrhizae are the result of a lasting union based on exchanges between plant roots and certain fungi in the soil. They are essential components in the soil-plant-microorganism relationship. Indeed, certain plant species cannot grow normally without associating with a fungal partner. In order to understand the ability of certain plants to adapt to xeric environments, we conducted our study in the Laghouat region on four spontaneous species: *Gazania linearis*, *Astragalus siculus*, *Peganum harmala* L, and *Rumex vesicarius*. We concluded that these plants were in symbiosis with mycorrhizal fungi, which play a major role in soil stabilisation, nutrition regulation and the carbon cycle. Microscopic examination of the roots of the four species revealed an endomycorrhizal colonisation rate: *Astragalus* 80%, *Rumex* 60%; *Peganum* 82% and *Gazania* 45% with the presence of arbuscular mycorrhizae and hyphae.

Keywords: Mycorrhize, soil, *Gazania linearis*, *Astragalus siculus*, *Rumex vesicarius*, *Peganum harmala*.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Phytoaccumulation of heavy metals from contaminated soil using a spontaneous plant (*Astragalus armatus*) in the Algerian steppe

SABKHAOUI Maroua Hibat Elmaoula¹ and MALLEM Hamida²

¹Biological and Agricultural Sciences Laboratory, Faculty of Sciences, Amar Telidji
University, Laghouat, Algeria

²Mechanics Laboratory, Natural Resources and Environment Team, Faculty of Sciences, Amar Telidji
University, Laghouat, Algeria

e-mail: mh.sabkhaoui@lagh-univ.dz

ABSTRACT

Heavy metals represent serious environmental pollutants; their presence in the atmosphere, soil, and water, even in trace amounts, can cause severe problems for all living organisms. Soil acts as a sink for heavy metals. The presence of certain plants can have a decontaminating effect on soils, a process called phytoremediation, which occurs through the following mechanisms: phytodegradation, phytoextraction, phytostabilization, and phytovolatilization. The objective of this work is to evaluate the accumulation of certain heavy metals (Zinc, Copper, Aluminum, and Silicon) in *Astragalus armatus*, a steppe plant well adapted to extreme environmental conditions. We selected three regions of the Algerian steppe dominated by this species. We collected samples of the aerial and root parts of this plant. After drying and grinding, the accumulation of heavy metals was analyzed by (FRX). The results obtained show that the accumulation of zinc, copper, aluminum, and silicon is higher in the aerial part compared to the root part of *Astragalus armatus*. The results obtained support the involvement of *Astragalus armatus* in a phytoremediation project to decontaminate soils contaminated by the phytoextraction mechanism.

Keywords: *Astragalus armatus*; Heavy metals; Phytoremediation; Pollution; Accumulation.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

EFFECT OF TWO TYPES OF MANURE (POULTRY AND RABBIT) ON THE GROWTH AND YIELD OF MAIZE (*ZEA MAYS* L.) IN THE AIN DEFLA REGION

Ali AROUS^{1*}, Rachid Fethi HAMMOUDA², Assia BOUZID³, Djamila MEHDEB⁴, Kadda
Mohammed Aminie CHOUHAIM^{3,5}, Kamel ZEMOUR^{3,5}

¹ERP Research Laboratory, Faculty of nature and life sciences and earth sciences, Djilali Bounaama University, Khemis
Miliana, Algeria

²Plant Ecology and Environment Laboratory. Faculty of Biological Sciences. USTHB, Algiers

³Laboratory of Agro-Biotechnology and Nutrition in Semi-Arid Areas, Ibn Khaldon university Algeria ⁴Biotechnology
Applied Laboratory to Agriculture and Environmental Preservation, Higher School of Agronomy, Ex-Hall of Technology,
Kharrouba, Mostaganem (27000), Algeria

⁵Laboratory of Agronomy-Environment, University of Tissemsilt, Algeria

*Email: a.arous@univ-dbk.m.dz

ABSTRACT

Soil degradation in semi-arid regions is an ecological problem in Algeria. These soils are not only subject to physico-chemical degradation, but also to pollution from a variety of sources, particularly agricultural fertilisation. These negative effects have a direct impact on production capacity and crop yields, so it is vital to preserve the environmental health of these soils. Our current work focuses on improving fertilisation and restoring degraded soils by setting up trials of organic fertiliser amendments. The study, carried out at the University of Ain Defla experimental station, compared four treatments in a randomized block design on maize (*Zea mays* L.): an amendment of rabbit manure, a compost of hen droppings, a 1/1 mixture of rabbit and hen manures and a control that received no amendment. The results showed that the application of the organic amendment significantly improved the growth and yield performance of the maize compared with the controls, which were characterised by early harvesting, poor growth and low yields.

Keywords: soil degradation, maize (*Zea mays* L.), organic amendments, sustainable development, manure, restoration

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

RARE SPECIES IN ALGERIA

Belaidi Yasmin¹ et Cherifi kouider²

Belhadj Bouchaib University of Ain Temouchenet

Plant Biodiversity Laboratory: Conservation and Valorization, Djillali Liabès University, BP 89, Haï Larbi Ben M'Hidi, Sidi Bel Abbès 22000, Algeria.

Yassmine.belaidi@univ-temouchent.edu.dz

ABSTRACT

Rare species in Algeria in southern Oran have been the subject of much study and research, the work undertaken is focused on three endemic monocot species: *Ornithogalum sessiliflorum*, *Cyprus algeriensis* var. *kukkonen* and *Helictotrichon filifolium*.

Research shows that the species *Helictotrichon filifolium* is found in two regions of the Tlemcen mountains and southern Oran, is also found in the Saharan atlas, the high middle atlas, the high plateaus of eastern Morocco and the mountains of eastern Morocco, also present in the Iberian Peninsula.

Ornithogalum sessiliflorum is an endemic Algerian-Moroccan species, the species is reported in: sahels, plateau of Oran and Mostaganem, mountains of Traras and Dohra of Oran, high tell, mountains of Tlemcen and high steppe plains.

Cyprus algeriensis var. *kukkonen* is a rare species present on the dunes between Ain Ben Khalil and Sefissifa as well as Ain Sefra, this species is considered a strict Algerian endemic.

Lithospermum fruticosum subsp. *diffusum* is a fairly rare plant that can be found on arid hillsides, preferably limestone, in the Mediterranean region, and also lively at an altitude of 1000 m.

Keywords: rare species, endemic species, Mediterranean basin, southern Oran, Algeria.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

The effect of sodium and calcium bentonite amendment on the performance of *Vicia faba* L. bean culture in salty soils of semi-arid regions, Case of the Wilaya of Relizane West Algeria

BACHIR BOUIADJRA Mohammed^{1*} el amine et GHELLAI Malika¹

¹Département des sciences biologique, faculté des sciences et technologies, Université de Relizane.
Algérie

* aminebachirb@gmail.com

ABSTRACT

Soil salinity is considered a major constraint in arid and semi-arid regions, drought and scarcity of rainfall in these regions are increasingly worsening the situation. Agricultural production is in permanent decline in the face of these abiotic stresses.

Faced with these challenges, it is essential to propose ecological and sustainable solutions for the rehabilitation of salty soils in these areas. This investigation focuses on the morphological and biochemical behavior of beans grown in salty soils in the Wilaya of Relizane in the presence of two types of bentonite.

The experiment is carried out in plastic pots filled with salty soil and doses of 5% of each clay, monitoring of growth parameters allows to visualize a depressive effect of salinity on morphological behavior, while in the presence of 5% of calcium bentonite of Maghnia the morphological traits show a clear improvement with an increase of 10% in the fresh biomass of the two organs, the water status of the plants displays a rate of 83% which remains significantly higher than that of the controls. The presence of 5% of calcium bentonite displays averages of 2.76 mg.ml⁻¹ of total chlorophyll. The results obtained at the level of the experiment indicate a depressive effect of salinity on the growth of the bean while the incorporation of bentonite clay improves the water status of the plants and ensures a good synthesis of chlorophyll pigments. At the end of these results it is important to note that bentonite is a natural substance characterized by a high water retention capacity and which can be used to correct the salty soils of arid and semi-arid regions, and ensure good production of different crops in the face of severe climatic disturbances.

Keywords: salinity, legumes, bentonite, biomass, chlorophyll.



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

APPLICATION OF GEOSTATISTICS IN THE STUDY OF THE RISK OF DEGRADATION IN THE SOUTHERN ALGERIAN STEPPE OF DJELFA, ALGERIA

Taibaoui B.^{1*} & Douaoui A.²

¹Laboratory Exploration and Valorization of Steppe Ecosystems, Biology Department, Faculty of Nature and Life Sciences, Ziane Achour University, Djelfa, Algeria.

²Biology Department, Faculty of Nature and Life Sciences University Center M. A., Tipaza., Algeria

*b.taibaoui@univ-djelfa.dz

ABSTRACT

This study was carried out in the Djelfa region, with the aim of analyzing the spatial structure of the Disturbance Index (DI) and its spatial variability, in order, on the one hand, to determine the spatial structure of the levels of degradation of steppe environments, by means of the variogram and, on the other hand, to use the parameters of the variogram to map the DI using the interpolation method of ordinary kriging and indicator kriging. The mean variogram of the DI effectively shows the existence of a spatial structure that fits a spherical theoretical model with a range of 4350 m, a nugget effect that tends towards zero. The map produced by ordinary kriging shows the distribution of disturbance index classes representing the different levels of degradation of plant formations in our study area according to three levels of degradation: $DI < 0,3$; $0,3 < DI < 0,6$; $DI > 0,6$. The geostatistical analysis of the disturbance index (DI) for the study area showed a high level of degradation, with almost 75% of the surface area classified in the category of degraded plant formations, with a probable risk of degradation of up to 90%.

Keywords: Geostatistics, Degradation, Steppe, Kriging, Djelfa.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

State of plant biodiversity in the natural forests of Djelfa: the case of Sénalba Chergui and Sehary Guebli

Aicha ZAOU^{1*}, Rachida KERZABI²

¹Department of Biology, Faculty of Natural and Life Sciences, University of Djelfa, Algeria.

²Research Center in Agropastoralism, CRAPast, Djelfa, Algeria.

*moycha.iuoaz@gmail.com

ABSTRACT

In the current context of climate change and the intensification of anthropozoic action, the steppe zone of Algeria is threatened by the degradation of its rangelands and the erosion of its faunistic and floristic biodiversity. Djelfa, a pastoral area by excellence, is of considerable ecological importance through its forests, which represent the last natural barrier against the advancement of desert.

Djelfa's natural forests are considered natural shelters for local and transhumant livestock breeders and their herds during dry, hot summer periods, and an important source of fodder after the decline of steppe rangelands in providing fodder for these demanding animals.

For this study, we were interested in assessing the biodiversity of two large forest areas in the region of Djelfa: Sénalba Chergui and Sehary Guebli, which are connecting areas between the large municipalities of the region where the pastoral load is very important.

Sixty surveys were carried out on four stations. The choice of plots is subjective and the minimum area chosen to inventory the flora is 100 m².

The results obtained show that the impact of anthropozoic action in the forest has a remarkable effect on plant biodiversity, with floristic richness estimated at 95 species and 71 genera, belonging to 24 families. The main families are Asteraceae, Poaceae, Lamiaceae and Brassicaceae, with the Mediterranean element dominating. The diversity indices tested (floristic richness, Shannon-Weaver index and equitability) show greater diversity at sites with a high level of anthropism. We also note that therophytization is responsible for the increase in indices in dry and disturbed environments.

Djelfa's floristic heritage is in a critical state if mankind continues to destroy the forest to meet its own needs (medicinal and aromatic plants, firewood, timber, charcoal, etc.) and the infinite needs of its livestock.

Key words: Natural Forest, biodiversity, semi-arid, degradation, anthropozoic, Djelfa.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

ISOLATION AND CHARACTERIZATION OF PLANT GROWTH-PROMOTING BACTERIA (PGPB) TO ENHANCE THE GROWTH OF *PINUS HALEPENSIS* IN THE COMBAT AGAINST DESERTIFICATION IN THE NAÂMA STEPPE, ALGERIA

Guettaf H, Sitayeb T.* Halla N.

Department of Biology, Faculty of Sciences, University of Saida, Algeria

*Guettafhalima48@gmail.com

ABSTRACT

For several decades, desertification has been a major environmental threat in many regions around the world, including the Naâma steppe in Algeria. This study focuses on the use of plant growth-promoting bacteria (PGPB) as an innovative strategy to improve the growth of Aleppo pine (*Pinus halepensis*), a crucial tree for the restoration of degraded ecosystems and the prevention of desert advancement. A total of 23 bacterial strains were isolated from the rhizospheric soil of Aleppo pine planted as part of a reforestation project dating back to 1975 in the Naâma steppe. The phenotypic and biochemical identification of the isolates shows their distribution in the genus *Bacillus* (60.86%) and *Azotobacter* (39.14%). A screening of PGP activities such as phosphate solubilization and atmospheric nitrogen fixation was carried out for all strains to identify the most effective ones. The results indicate that 43% of *Bacillus* strains and 67% of *Azotobacter* strains have the ability to solubilize phosphate at a rate of 10 μgml^{-1} or higher. Regarding nitrogen fixation, assessed by the ability of bacteria to grow in a nitrogen-free medium, this competence is observed in all *Azotobacter* strains and in 50% of *Bacillus* strains. In conclusion, it is important to highlight that our research is currently ongoing, particularly the in vivo evaluation of the most efficient strains for the growth of Aleppo pine. This phase represents a crucial part of our project, and the results are highly anticipated to make a significant contribution to our understanding of the impact of microbial interactions on sustainable forestry.

Keywords: PGPB; desertification; ecological restoration; Aleppo pine.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

FUNGAL DIVERSITY IN RHIZOSPHERE SOIL OF *ARTEMISIA CAMPESTRIS* L. AT CHABKA, AIN FEKKA, DJELFA DEPARTMENT (ALGERIA)

Berrached R.^{1,2*}, Mechiah F.¹, Ainouz L.³, Ait Amara T.³, Saadoun N.¹

¹Natural Resources Laboratory, Faculty of agriculture and biological sciences, University Mouloud Mammeri of Tizi-Ouzou, Algeria

²Laboratory of plant ecology and environment, Faculty of biological sciences, University of sciences and technology Houari Boumediene, Algeria

³Faculty of agriculture and biological sciences, University Mouloud Mammeri of Tizi-Ouzou, Algeria

*rachda.berrached@ummto.dz

ABSTRACT

Plants interact with diverse soil organisms in order to access to necessary nutrients and to cope with different environmental constrains. Among these organisms, fungi present the main dominant group in soil, with bacteria, where they can constitute a considerable part of soil biomass, especially in arid and semi-arid environments suspected, for a long time, as poor environments. The aim of this work is to study fungal diversity and their abundances in the rhizospheric soil of *Artemisia campestris* L. Soil samples were collected on November, 4th 2022, corresponding to the beginning of the reproductive growth of the plant. Results showed the presence of 22 fungal genera, namely *Aureobasidium*, *Alternaria*, *Arthrinium*, *Aspergillus*, *Bipolaris*, *Candida*, *Chaetomium*, *Cladosporium*, *Eupenicillium*, *Fusarium*, *Gymnoascus*, *Mucor*, *Neoscytalidium*, *Penicillium*, *Phoma*, *Pythium*, *Rhizoctonia*, *Rhizopus*, *Torula*, *Trichoderma*, *Trichophyton* and *Ulocladium*. 19 of these genera belong to the Ascomycota phylum (83.36%), but 3 of them belong to other phyla, namely Basidiomycota, Chytridiomycota and Zygomycota. The genus *Aspergillus* was the most abundant among all genera identified (31.48%), while *Fusarium*, *Penicillium* and *Cladosporium* were represented with 11.11%, 9.26% and 7.40%, respectively. Analysis of variance revealed that the distribution of *Alternaria*, *Eupenicillium*, *Trichoderma*, *Fusarium* and *Mucor* is different between soils. This richness in fungal strains is explained by the water deficit of such environment. To overcome this water deficit, plant tends to release primary and secondary metabolites in soil rhizosphere in order to attract microorganisms, including fungi, which increase its capacity to tolerate high temperature, soil salinity and water deficit.

Keywords: *Artemisia campestris* L., frugal soil, rhizosphere, steppe ecosystem.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Isolation and characterization of fungal strains from some spontaneous plants in the Laghouat region

Fatima BENHAFFAF^{2*}, Mériem MARFOUA², Hamida MALLEM¹, Khadidja BENHMIDA²

¹Mecanic's laboratory; Environment and natural resources Team, Amar Telidji University of Laghouat, Algeria

²Department of agricultural sciences, Faculty of sciences, Amar Telidji University of Laghouat, Algeria

Corresponding author: f.benhaffaf@lagh-univ.dz

ABSTRACT

Intensive agriculture, while essential to meet food needs, often leads to soil degradation and water pollution due to the excessive use of chemical fertilizers. Biofertilizers, derived from beneficial microorganisms, provide an ecological alternative by enhancing nutrient availability and soil structure. They also strengthen the resilience of crops against abiotic stresses. Soil fungi play a key role in the resilience of agricultural systems to climate change. The objective of this work was to isolate fungal strains from the rhizosphere of some spontaneous plants in southern Algeria (Laghouat), which is characterized by an arid climate with specific soils and presents a unique biodiversity of spontaneous plants that may host a variety of still unknown soil fungi. 12 rhizospheric soil samples were collected from 4 different areas of the Laghouat region during the months of January, February and March 2024. The isolation of fungi was carried out using the suspension-dilution method. These isolates were cultured and purified on PDA medium and their characterization was carried out through microscopic and macroscopic observations. The isolates were then tested for their tolerance to various abiotic factors, including temperature and pH, 357 fungal colonies have been recorded, divided into 13 isolates belonging to five genera: *Aspergillus*, *Penicillium*, *Fusarium*, *Rhizopus*, and *Alternaria*. The most abundant genera were *Aspergillus* and *Penicillium*, with a varied distribution according to the soil samples. Growth tests showed that the optimal temperatures for the development of the isolates ranged between 22°C and 37°C. No growth was observed at 45 °C. This study highlights the diversity and potential of soil fungi isolated from spontaneous plants in Laghouat. The identified isolates could play a crucial role in the development of integrated pest management strategies, contributing to more sustainable and resilient agricultural systems.

Keywords: Fungal isolates, biodiversity, Laghouat, spontaneous plants.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

USE OF MACHINE LEARNING MODELS AND SENTINEL_2 DATA ON GOOGLE EARTH ENGINE FOR MAPPING LAND USE AND DISTRIBUTION OF ATLAS PISTACHIO IN THE PROVINCES OF NAAMA AND EL BAYADH (SOUTH-WEST ALGERIA)

Naimi BENDOUINA^{1*}, Lakhdar GUERINE¹, Kouider HADJADJ¹

¹Salhi Ahmed University Centre, Naâma, Laboratory "Sustainable management of natural resources in arid and semi-arid zones"

*Corresponding author email: naimi.bendouina@cuniv-naama.dz,

ABSTRACT

This study, conducted in the wilayas of El-Bayadh and Naâma, aims to map in detail the land use units, paying particular attention to the distribution of Atlas Pistachio populations. The main methodological approach relies on the use of the Google Earth Engine (GEE) platform coupled with Machine Learning algorithms such as random forests. The data used includes high-resolution optical satellite images from Sentinel 2A (10 meters), acquired in June 2023. The rigorous methodological process encompasses image preprocessing, the creation of a composite image integrating various spectral indices and bands, as well as the establishment of training and validation points. The evaluation of the classification relies on a set of robust metrics. The performance of the learning algorithms proved remarkable, achieving an overall accuracy of 83.31% and a Kappa coefficient of 0.80 for random forests, as well as an overall accuracy of 66.63% and a Kappa coefficient of 0.61 for LibSVM. The detailed results of the random forest classification reveal the following distribution of land use classes relative to the total area of the study zone: water bodies 0.01%, dunes 43.53%, pastures 42.70%, bare soil 7.66%, built-up areas 0.82%, agriculture 0.77%, reforestation 2.06%, scrubland 0.19%, Atlas Pistachio 0.03%, Chott and Sabkha 1.15%, jujube 1.07%. This study thus offers an accurate and comprehensive view of the spatial distribution of the different land use units in the region, constituting a significant contribution to guiding conservation and rehabilitation initiatives for natural resources, particularly for the relict populations of Atlas Pistachio.

Keywords: El-Bayadh; Naâma; land use; Atlas Pistachio; Sentinel-2; Machine Learning; GEE.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

ANALYSIS OF THE MODIFICATIONS AND DEGRADATION OF NATURAL RESOURCES IN THE STEPPIC ZONE: CASE OF M'CIF (M'SILA)

Madani Djamila¹, Tarai Nacer², Smaili yasmina¹, Abdou Yamina³

¹University of M'Sila, Department of Agricultural Sciences, Faculty of Sciences BP 166 Echbilia, 28000, M'Sila (Algeria), djamila.madani@univ-msila.dz, <https://orcid.org/my-orcid?orcid=0000-0002-8957-2464>.

²University of Biskra 07000 (Algeria), Department of Agronomy, Faculty of Exact Sciences, nacer.tarai @univ-biskra.dz.

³Associate Professor of Architecture and Urban Planning, Department of Architecture, Biskra 07000 (Algeria), Laboratory of Design and Modelling of Architectural and Urban Forms and Ambiances - LACOMOFA-, University MOHAMED KHIDER, Biskra (Algeria), y.abdou@univ-biskra.dz

ABSTRACT

This research aims to analyze and track changes in land use in the M'cif region of Msila, Algeria, from 2000 to 2020. Three Landsat satellite images were utilized (TM-2000, ETM+-2010, and OLI-2020) for a spatiotemporal survey. A supervised classification technique employing the maximum likelihood algorithm was employed to categorize land use, generating thematic maps with six main classes. Precision evaluation was conducted for each map using a random method. Additionally, a post-classification technique was utilized to create a detailed matrix of changes between 2000 and 2020. Results indicate significant degradation of grasslands (-130.154 Km²) and expansion of sand dunes, agricultural lands, sebkhas, and urban areas by +2.17 Km², +16.19 Km², +49.66 Km², and +1.21 Km² respectively. The study identifies a disruption in the natural resource equilibrium due to high demands from local populations.

Key words: Modification, degradation, steppic, thematic, land occupation, M'Cif, M'sila.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

SPATIAL EVOLUTION OF SILTING IN EL-BAYADH AND NAAMA PROVINCES: A DIACHRONIC AND CARTOGRAPHIC APPROACH BASED ON SENTINEL-2A IMAGERY AND MACHINE LEARNING

Lakhdar GUERINE*, Naïmi BENDOUINA and Kouider HADJADJ

Salhi Ahmed University Center, Naâma, Laboratory for Sustainable Management of Natural Resources in Arid and Semi-Arid Areas

*lguerine@cuniv-naama.dz

ABSTRACT

The silting in the steppe areas of Algeria is a major environmental issue affecting vast expanses of arid lands. This phenomenon is caused by soil degradation due to land overexploitation, overgrazing, drought, and climate change. The study conducted in the wilayas of El-Bayadh and Naâma aimed to map the evolution of land use between 2019 and 2023 using the Google Earth Engine (GEE) platform and the Random Forest (RF) Machine Learning algorithm. Exploiting the high resolution of Sentinel-2A images and vegetation indices, including NDVI, SAVI, NDMWI. The results demonstrated the classification performance with an overall accuracy of 89% and a Kappa coefficient of 0.87 for the year 2019 and an overall accuracy of 91% and a Kappa coefficient of 0.90 for the year 2023. Changes in land use evolution between 2019 and 2023 are marked by a reduction in the area of pastures by -455,897.94 Ha, an increase in the area of dunes and shifting sands by +390,112.77 Ha, a reduction in the area of water bodies by -737.01 Ha, and an increase in the area of bare soil by +160,688.04 Ha. The obtained results provide a detailed insight into the evolution of desertification in the studied region, thus making a significant contribution to correcting the layout of the Green dam area and planning conservation and rehabilitation initiatives.

Keywords: Desertification, Silting, El-Bayadh, Naâma, Algorithm, Google Earth Engine.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Contribution and Evaluation of Soil Quality in the Ammari Region, Tissemsilt

OUABEL Habib^{1*}, TALEB Mohamed Lamine¹ and GACEMI Abdelhamid²

^{1,2}Department of science of nature and life, Faculty of science and technology, University of Tissemsilt. Algeria

³National Institute of Agronomic Research Hmadan Research Station, Relizane, Algeria

*Corresponding author: Ouabel Habib: ouabel.habib@univ-tissemsilt.dz

ABSTRACT

Our study, conducted in the Ammari-Tissemsilt region Algeria, involved analyzing soil particle size and physico-chemical properties to better understand its composition and fertility. Additionally, we utilized remote sensing and satellite imagery spanning three decades for comparative analysis, enabling us to monitor changes in soil and agricultural practices over time. The results from our analysis provided precise data to mitigate negative agricultural effects, emphasizing the importance of understanding current land use for ensuring profitability and sustainability.

We advocate for sustainable resource management practices aimed at preserving and enhancing soil fertility. This includes implementing resource-friendly agricultural techniques such as crop rotation, soil conservation methods, and efficient water management. By integrating these approaches, we can ensure sustainable and profitable agricultural production while conserving natural resources. Our study findings serve as a practical roadmap for farmers and policymakers, offering strategies to enhance agriculture's resilience to climate challenges.

our research sheds light on the agro-ecological dynamics of the Ammari-Tissemsilt region, presenting pathways towards a more sustainable agricultural future.

Keywords: soil quality, degradation, Ammari-Tissemsilt region, conservation agriculture

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Poster Session C

Hyperspectral remote sensing in precision agriculture: present status and future trends

Salim LAMINE^{1,*}, Ahmad KAYAD², Abdul QADIR³ and Nasem BADRELDIN⁴ Krishna Vadrevu³

¹ Higher School of Saharan Agriculture Adrar, National Road N°06, Adrar 01000, Algeria

² Intermountain Research and Extension Center, University of California, Tulelake, CA 96134, USA

³ Department of Geographical Sciences, University of Maryland, College Park, MD 20740, USA

⁴ Department of Soil Science, University of Manitoba, Winnipeg, MB, R3T 2N2, Canada

Corresponding author's email: salim.lamine@gmail.com

ABSTRACT

Precision Agriculture (PA) has emerged as a critical paradigm in contemporary farming practices, aiming to revolutionize crop management by optimizing yields, enhancing decision-making processes, and maximizing resource efficiency. Central to the success of Precision Agriculture is the integration of Remote Sensing (RS) technologies, with hyperspectral imaging standing out as a particularly potent tool. By providing detailed insights into various aspects of crop health, soil conditions, and other crucial biotic and abiotic variables, hyperspectral remote sensing has become indispensable in the agricultural sector. This research conducts a comprehensive review of the present status and future trends of hyperspectral remote sensing in precision agriculture. A primary focus is placed on elucidating the pivotal role played by hyperspectral imaging in furnishing precise biophysical indicators and monitoring crop development cycles with unparalleled accuracy. Furthermore, the study highlights the evolving landscape of RS technologies and the increasing utilization of drone-based hyperspectral data for advanced agricultural monitoring. One of the key areas explored in this review is the recent advancements in RS technologies, particularly the integration of hyperspectral imaging with drone technology. This amalgamation has facilitated the collection of high-resolution data, enabling farmers to monitor crops more effectively and make informed decisions in real-time. Moreover, the study delves into the challenges, limitations, and advantages associated with hyperspectral remote sensing in precision agriculture. By identifying these factors, the research aims to provide valuable insights that can inform future research endeavors and drive innovation in the field. By shedding light on the potential of integrating hyperspectral imaging with drone technology, this comprehensive analysis underscores the transformative impact of such synergies on precision agriculture practices. It is envisioned that this integration will not only facilitate more informed decision-making but also contribute to the sustainable management of agricultural resources. Ultimately, this review seeks to pave the way for future research and development initiatives aimed at harnessing the full potential of hyperspectral remote sensing in precision agriculture, thereby fostering sustainable agricultural practices and ensuring food security for future generations.

Keywords: Precision Agriculture, Remote Sensing, Hyperspectral Imaging, Crop Monitoring, Drone Technology.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Transhumant pastoralists and sedentary agro-pastoralists of the central Algerian steppe (case study of Djelfa province)

Adel Boussaïd

orcid.org/0009-0005-9393-093X; Ziane Achour-Djelfa University, Nature & Life Sciences Faculty, Earth & Universe Sciences Department, Djelfa, Algeria.

Serge Schmitz

orcid.org/0000-0002-3412-818X; UR SPHERES, University of Liège, Department of Geography, Laboratory for the Analysis of Places, Landscapes and European Campaigns (Laplec), Liège, Belgium.

Foufou Attif

Ziane Achour-Djelfa University, Nature & Life Sciences Faculty, Earth & Universe Sciences Department, Djelfa, Algeria.

ABSTRACT

This work analyzes the modes of living and the agro-sylvo-pastoral practices of 500 families in a steppe region of the Saharan Atlas. The rural population is now sedentary and transhumant. The case of the Wilaya of Djelfa allows us to understand how these modes of travel fit into the various local environments and what their potential impacts are on desertification. Field observations, surveys and statistical analyses show that in addition to exploiting local plant resources, household heads interviewed in four different environments (forest, scrubland, steppe, dune and chott) practice supplementation for their herds, which results in increasing their size and intensifying overgrazing. Similarly, water supply is no longer traditional: while some overexploit the underlying aquifers, most agropastoralists use tanker trucks. The adaptation of the ways of living and exploiting the environment is strongly determined by the household capital which makes it possible to compensate for local shortcomings, with however important consequences on the accentuation of desertification.

Keywords: practices, living, semi-arid steppe, landscape, pasture, desertification, Djelfa, sedentary, transhumant.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Analysis of Desertification Programs in the Algerian Steppes

MOHAMED CHERIF MUSTAPHA

Assistant professor --university Ziane achour Djlefa
cherif_mustapha@yaoo.fr

ABSTRACT

The desertification is a major risk that threatens the arid and semi-arid regions through- out the globe. With continued population growth, desertification exacerbates while natural areas regress as a result of rapid urbanization, increase of cultivated land areas, overgrazing, and deforestation. This adds to the effects of climate change. Algeria as many countries is not safe from this risk. Indeed, agronomists and ecologists report that Alfa grass cover has reduced while the quality of the grasslands itself is becoming increasingly degraded. To tackle this serious risk, the Algerian authorities developed the Green Dam project as a massive reforestation program aiming to safeguard and to develop the pre-Saharan area. It is widely recognized that desertification is a serious threat to arid and semiarid environments which cover 40% of the global land surface and are populated by approximately 1 billion humans, of the 238 million hectares that make the total land area of Algeria, 200 million are natural deserts, 20 million represent the steppe regions threatened by desertification, and 12 million are mountainous areas threatened by water erosion. The sensitivity map of desertification shows that 7 million hectares of the 20 steppe regions are highly susceptible to desertification and require a short-term intervention. In face of such risk, the Algerian state initiated the reforestation activities since independence in 1962.

Green Dam initiative became clearer in the 60s with the rapid degradation of Alfa grass steppe that resulted from overgrazing and cultivation activities. The implementation of this vast project started in early70's and extends from the western to the eastern borders of Algeria, the scope of action of the Green Dam consists of the pre-Saharan area between isohyets 300 millimeters in the North and 200 millimeters to the South, covering an area of 1500 km by 20 km on the average, or 3 million hectares.

The Chinese call the Gobi Desert in the north the 'Yellow Dragon'. It spits sandstorms as far south as the capital Beijing, and this dragon likes to stay on the move. Never one to shirk a challenge, China decided to begin a 70-year campaign to thwart the dragon wielding a sword called 'Trees'.

China has lost 3,600 km² of grassland annually following the progression of the Gobi Desert in recent years³, which has harmful ecological consequences. Each year, sandstorms remove some 2,000 square kilometers of surface soil. 27% of Chinese territory, on which 400 million people live, is affected by the expansion of the desert, at an estimated cost of 16 billion euros annually

The most recent phase the 4th phase which began in 2003 has two components: on the one hand aerial seeding to cover large areas of land where the soil is less arid and on the other hand the remuneration of farmers for planting trees and shrubs in areas that are the most arid⁶. A budget of \$1.2 billion was also allocated to the establishment of a surveillance system (mapping and surveillance databases)

The army is also mobilized to plant trees: 60,000 soldiers from the People's Liberation Army were assigned to the project at the beginning of 2018. Projects to combat desertification require political will and huge financial and high-tech capabilities in order to ensure the success of the process.

Keywords: desertification. Course. Degradation. biodiversity. the steppes. struggle. The Great Green Wall of China. green dam.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Assessment and Mapping of Soil Erosion Risk Using a GIS/RUSLE Approach in the Watersheds of Northeastern Algeria (Constantinois-Seybouse-Mellègue).

Tahani DERRADJI^{1*}, Imad-Eddine BOUZNAD¹, Rabah Zebba¹ and Mohamed-Salah BELKSIER²

¹Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre et de l'Univers, Université 8 Mai 1945 Guelma, Algérie

²Faculté des hydrocarbures, des énergies renouvelables et des sciences de la terre et de l'univers, Université Kasdi Merbah. Ouargla, Algérie

*tahani.derradji@yahoo.com

ABSTRACT

Algeria is one of the countries affected by water erosion, a phenomenon that is rapidly expanding and causing increasingly concerning effects. Soil erosion assessment is crucial for planning and conservation efforts in the Constantinois Seybouse-Mellegue region, located in northeastern Algeria. This watershed is characterized by high variability in rainfall and a range of climatic conditions, from humid in the north to semi-arid in the south. In this study, the Revised Universal Soil Loss Equation (RUSLE) model, integrated with a Geographic Information System (GIS), was used to estimate soil loss in this area. Our goal is to determine the hydrometric parameters of the watershed, describe land use conditions, and produce a map of natural water-related risk areas (water erosion). Achieving this objective requires understanding the region's topographic, hydroclimatic, and lithological conditions, as well as modeling satellite image processing data and Digital Elevation Models (DEM) within a GIS framework.

According to the results and the synthesized map obtained, the watershed remains vulnerable to water-related natural hazards, with an average annual soil loss rate. The risk of erosion increases at higher elevations as slopes intensify. These results could be valuable to decision-makers and planners in making informed decisions regarding water and soil conservation.

Keywords : Risque, Erosion hydrique, RUSLE, SIG.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

ESTIMATION OF LAND LOSS IN SEMI-ARID ZONE BY USING REMOTE SENSING AND GIS

GLIZ Mohamed^{1*}, REMINI Boualem²

¹Department of Agronomy, Faculty of Natural and Life Sciences, University of Mascara, BP305,
Mascara 29000, Algeria

²Department of Water and Environmental Sciences, Faculty of Engineering Sciences, University of
Blida, Blida 9000, Algeria

*gliz.moh68@gmail.com

ABSTRACT

Located in the North West of Algeria, the watershed of the El Hammam wadi is threatened by water erosion which results in the siltation of the waterfall dams: Ouizert, Bouhanifia and Fergoug. The objective of this paper is to develop a methodology using remote sensing and geographic information systems (GIS) to map water erosion in this watershed and to produce a sensitivity map, which can be used as a reference document for decision-makers. The methodology presented consists of integrating, into GIS, three factors controlling erosion: slope, friability of materials and land use. The resulting erosion sensitivity map shows three areas of vulnerability to water erosion: low, medium and high. The areas of high sensitivity correspond to the soils of the Fergoug sub-basin.

Keywords: wadi El Hammam, methodology, remote sensing, GIS, water erosion, watershed.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Algerian steppe areas and territorial planning: Real geographical and biophysical differentiations but precise delimitations pending

Mohamed Taabni

Université de Poitiers.
Laboratoire RURALITES

ABSTRACT

Since the independence of Algeria in 1962, steppe areas have experienced accelerated changes under the action of public planning policies, private actors and under the impact of regressive environmental dynamics. Considered for a long time mainly as pastoral areas for extensive livestock breeding, transhumant, are supposed to become attractive. Public policies initially aimed at improving rangelands, livestock breeding (1970s), fighting against land degradation and wind erosion (Green Dam 1971-1993), aid for the creation of irrigated areas (drillings and wells). They were followed by those concerning living conditions (basic infrastructure, pastoral villages, water supply, opening up with tracks and roads), administrative supervision with successive administrative redistributions and the creation of new wilayas and communes. From the 1980s onwards, the National Territorial Development Scheme emerged which defined the steppe high plateaux as a programming region for sectoral investments (through the SRAT Hauts Plateaux). The steppe highlands, thanks to multi-sectoral investments (programmed by this revised plan at various periods: 2005, 2019, etc.) for employment and economic activities, are supposed to attract or maintain the population on site and mitigate migratory flows towards the areas. Coastlines.

The steppe spaces (estimated at 35 million hectares) are both a physiographic framework (plateaus, foothills, mountain ranges with valleys, basins with vast endorheic salt lakes (the Chotts, Sebkhass, Zahrez, its dune systems and plains characterized by a marginal Mediterranean climate and steppe plant formations (which gives them their landscape and biogeographic identity) where esparto and sagebrush dominate (with halophilic plants in the halomorphic and psammophilic soils on the outwash and sandy microdunes). Average annual precipitation ranges from 100 to 400mm in these areas; however, these isohyets experience significant variations depending on the year. In the language of developers, the terms high plateaux (Central and Western Algeria) and high Constantine plains (Eastern Algeria) are preferred to “steppe”.

In the development programs relating to agro-pastoral potential, actions relate to the improvement of rangelands, fencing, reforestation, the development of small irrigated areas and arboriculture of rustic species, soil improvement, etc. ...The fact is that if development actions are listed in the areas of the high plateaux and high plains, there are many actions that target steppe environments/ecosystems with the aim to reducing their degradation or better valorizing them. To date, unfortunately, there is no systematic mapping on the scale of all Algerian steppe communes of the different types of biogeophysical spaces and the types of agrosylvopastoral development carried out. However, this type of document is essential in order to monitor the dynamics in these environments and the qualitative and quantitative effects of agrosylvopastoral developments (whatever the modes of use or ownership).

A national desertification sensitivity map, using satellite imagery and geographic information systems, was produced in January 2010 by the Algerian Space Agency, ASAL) and National Center for Space Techniques (CNTS) for the Ministry of Agriculture and Rural Development. The area covered extends over 27.5 million hectares over 12 steppe wilayas (Naama, Tlemcen, El Bayadh, Saida, Tiaret, Laghouat, Djelfa, M'sila, Batna, Biskra, Khenchela, Tébessa) with mapping at scale of 1/200,000. If the maps produced were distributed to all forest conservation services in the wilayas concerned, with the corresponding explanatory notices, they had to be compared in the field and validated by municipality with a view to implementing an action program to combat the desertification over 5 years (2010 – 2014). Information relating to this downscaling (municipal level) is not available or accessible (on what cartographic medium - topographic maps at 1/50,000?, 1/25,000? -).

In order to get out of the vagueness relating to the quantitative estimation of degraded or restored steppe surfaces, it is imperative to have a cartographic inventory that meets the development challenges and also for better efficiency of actions and monitoring of actions by all the actors concerned and all levels. This communication aims to shed light on the debate on the tools and documents essential for understanding current dynamics and their contributions to action programs with a view to the coherence and effectiveness of developments.

Keywords: Steppe, Algeria, inventory, cartography, desertification, development.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

ASSESSMENT OF SENSITIVITY TO DESERTIFICATION IN THE MIDDLE-OUED-TOUIL WATERSHED USING THE MEDALUS APPROACH

LAOUISSET M.B.¹, FRIH B.²

¹Scientific and Technical Research Centre on Arid Regions, Algeria.

²Department of Biology and Plant Ecology, Valorization of Biologic & Natural Resources research laboratory (VRBN), Farhat Abbas University Setif1, Algeria.

*laouissetbensalah@gmail.com

ABSTRACT

This study aims to evaluate the sensitivity to desertification in this watershed, which belongs to the steppe region, by using the MEDALUS model (Mediterranean desertification and land use), developed using GIS and remote sensing tools, which calculates the Desertification Sensitivity Index (DSI) through the composition of four indices: the Soil Quality Index (SQI), the Vegetation Quality Index (VQI), the Climate Quality Index (CQI) and the Land Use Quality Index (LUQI). These indexes are result of overlaying eight thematic maps: Lithological map; Land use map; Isohyet map; Bioclimatic zones map; Average annual soil moisture map; Developed areas map; Slope classes map; Exposure map. These thematic layers, sourced from various origins, are converted into digital format, resulting in the creation of a detailed geomatics database for this region. The database will serve as a decision-making tool for different services and/or organizations responsible for managing this steppe area. It is therefore essential to spatially evaluate the effects of desertification to address this phenomenon and propose the best strategies for combating, conserving, and managing this space. Consequently, the development of the desertification sensitivity map led to the identification of four distinct aspects: less sensitive zones; potentially sensitive zones; fragile zones; critical zones. Thus, management interventions can be precisely targeted for each zone.

Keywords: Desertification, steppe region, MEDALUS, map sensitivity of desertification, teledetection & GIS, development.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Status of the Boussaleh State Forest (Lardjem, Wilaya of Tissemsilt) Using Normalized Difference Vegetation Index

Mohamed Lamine TALEB^{1*}, habib Ouabel¹, Rabeh BENAÏSSA¹

¹Natural and Life Sciences, Sciences and Technologies, Tissemsilt University, Algeria.
*taleb.amine8@gmail.com (*Corresponding author's email only)

ABSTRACT

The study area, located in the daïra of Lardjem, features one of the most important forests in the region, dominated by Aleppo pine. It is characterized by a semi-arid climate with a dry season lasting from May to September, spanning four months.

Each year, this forest faces an alarming recurrence of fires that devastate dozens of hectares. This situation is particularly concerning as the forest is situated in mountainous terrain, making access to all areas difficult.

The analysis of satellite images using a Geographic Information System over a 20-year period (from 2002 to 2022), specifically from the Landsat satellite during the summer months, has produced four thematic maps highlighting the intensity of chlorophyll activity through NDVI analysis. The results reveal several important points: The regions exposed to the north of the study area are the least affected by forest fires; The annual recurrence of fires negatively impacts mature trees, which subsequently become suitable fuel for future fires; The areas affected by fires exhibit conditions conducive to significant regeneration; Consecutive years marked by significant water deficits, such as the period from 2018 to 2022, play a significant role in the spread of forest fires.

This study aims to provide a better understanding of a concerning issue for the forest of great importance in the wilaya of Tissemsilt. Our goal is also to emphasize the need for further research to develop a real-time fire monitoring system. We hope to contribute to better fire management and prevention to protect this essential forest.

Keywords: SIG, NDVI, Lardjem, Boussaleh State Forest, Forest fires.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Impact Assessment of the waste rock from the Boukhadra mine on soil degradation in the exploitation area, Tebessa – Algeria

TIOUR Fahem¹, IDRES Abdelaziz²

¹Department of Science and Technology. Faculty of Science and Technology. Abderrahmane Mira. Béjaia- Algeria

²Mining Department. Faculty of Earth Sciences. BADJI Mokhtar. Annaba - Algeria.

E-mail: fahem.tiour@univ-bejaia.dz

ABSTRACT

Iron ore rock contains iron, making it an essential raw material for the development of various economic sectors. However, the Boukhadra iron ore mining operations produce various types of mining waste, such as raw waste, mining waste, as well as waste from crushing, ore transport by conveyor or by truck and the homogenization station. It is possible that these mining wastes generate acidic drainage in contact with air and water. It has direct repercussions on the deterioration of fauna and flora, which contributes to the acidification of fresh waters observed on a large scale for several decades. These mining waste must be managed rationally, intelligently and safely in order to preserve the environment.

This work aims to assess the impact of waste rock from the exploitation of the Boukhadra mine on soil degradation in the area concerned. Preserving soil and water quality is a fundamental issue for sustainable management of water resources. To this end, chemical analyzes were carried out using different techniques to determine the presence and concentration of major, minor and trace elements.

The operating activities of the Boukhadra mine disturb the water table in the area, with potential consequences for surrounding homes, by contaminating both surface and groundwater. This study indicates that waste rock from mining could be transported to the water table by the wind or by runoff due to precipitation. Chemical analyzes revealed the presence of sulfur oxide at minor concentrations, reaching 0.57%.

Key words: Boukhadra mine, acid mine drainage, soil degradation.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Impact of environmental factors on some secondary metabolites of medicinal plants

Rania ARABI¹, Meriem CHAFAA¹, Leila SOUDANI¹, Zohra ARABI², Rania AMEDJEKOUH¹

¹Laboratory of Agro-Biotechnology and Nutrition in Semi-arid Areas, Faculty of Nature and Life Sciences, University Ibn Khaldoun, Tiaret, Algeria

²Faculty of Nature and Life Sciences, University Ibn Khaldoun, Tiaret, Algeria

*rania.arabi@univ-tiaret.dz

ABSTRACT

Medicinal plants are rich sources of various phytochemical compounds, including fatty acids, sterols, alkaloids, flavonoids, polyphenols, glycosides, saponins, tannins, and terpenes. These plants are currently facing a range of environmental stresses as a result of climate change, impacting their growth and development. Factors such as temperature, carbon dioxide levels, lighting conditions, ozone exposure, water availability, soil salinity, and soil fertility play crucial roles in influencing the physiological and biochemical responses of medicinal plants, as well as their secondary metabolic processes. Secondary metabolites (SMs) derived from these plants are essential for evaluating the efficacy of therapeutic ingredients and are increasingly being utilized as natural-derived drugs, including immune suppressants, antibiotics, anti-diabetics, and anti-cancer agents. The primary objective of this study is to review and consolidate recent findings on the effects of climate change on secondary metabolism, exploring the molecular mechanisms underlying these changes and their implications on the overall concentration of these bioactive compounds within medicinal plants. The collection of data was achieved using several scientific search engines such as Google Scholar, Web of Science, Scopus, ScienceDirect, SpringerLink, Wiley Online, SciFinder, and PubMed. The collected data were organized and classified, analyzed, and summarized in this review according to each field. The chemical composition concerning phytochemistry data, the IUPAC names of the identified chemical compounds were checked using the PubChem database. The chemical structures were drawn using ChemDraw Pro 8.0 software.

Keywords: Abiotic stress, Secondary metabolites, Medicinal plants, Soil fertility, Climate change.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Effect of salt stress on growth and essential oil yield of an aromatic plant

Ghanai R.^{1*}

¹Department of Department of Biotechnology, Faculty of nature and life sciences, University of Blida 1, Algeria
* ghrafika@gmail.com

ABSTRACT

Salvia officinalis, a species of Mediterranean origin, is renowned for its medicinal and cosmetological properties. Its morphological characteristics enable adaptation to arid climatic conditions. This study aims to examine the effect of salt stress on the growth and essential oil yield of *S. officinalis*. Plants were subjected to salt stress with a water salt concentration of 3 g/L. Growth measurements, including root and stem elongation, were taken for both test and control groups during the stress period. The results indicate that the species' tolerance to salt stress is evidenced by increased growth of the underground parts and a reduction in stem length. Essential oil extraction via hydrodistillation yielded 0.341% for the control group and 0.384% for the stressed group. These findings suggest that salt stress may enhance the essential oil yield of *S. officinalis*.

Keywords: *Salvia officinalis*, Salt stress, Essential oil yield, Growth measurement, Hydrodistillation.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Poster Session D

ASSESSMENT OF THE EL KERMA WASTEWATER TREATMENT PLANT'S PERFORMANCE AT THE SEOR LEVEL BY BASIN SIZING (ORAN)

Walid REZIG^{1*}, Rayan BELKACEM²

^{1,2}Laboratory of Sciences, Technology and Process Engineering; Department of Chemical Engineering; Faculty of Chemistry; University of Sciences and the Technology of Oran Mohamed Boudiaf USTO-MB; BP 1505 El M'naouer Bir El Djir 31000 Oran; Oran; Algeria.

*walidrzg@gmail.com (*Corresponding author's email only)

ABSTRACT

Our study based on the analysis of physico-chemical parameters such as hydrogen potential, temperature, conductivity, dissolved oxygen, suspended solids, and parameters by atomic absorption such as chemical oxygen demand (COD) and biochemical oxygen demand for 5 days (BOD₅), total nitrogen, total phosphorus, and calculations of COD and BOD₅ abatement rates, confirms that the El Karma wastewater treatment plant is functioning properly. Effluents treated by the El Karma wastewater treatment plant in the wilaya of Oran are normally discharged with concentrations meeting the standards for discharge into nature designated by the Algerian state. At the end of our work, a technical-economic study of the extension was made, by implementing a project, to improve the tasks performed in the biological treatment chain specifically, and in order to increase the hydraulic capacity of the El Karma wastewater treatment plant with activated sludge.

Keywords: Physico-chemical, El Karma, wastewater treatment plant, effluents, activated sludge.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

ASSESSMENT OF GROUNDWATER QUALITY AND ITS SUITABILITY FOR AGRICULTURAL USE IN THE AIN OUSSERA PLAIN, DJELFA, ALGERIA

Fatah BOUTELDJAOUÏ^{1,2*}

¹Department of Agricultural and Veterinary Science, Faculty of Natural Science and Life, University of Djelfa, PO Box 3117, Djelfa 17000, Algeria.

²Laboratory for Exploration and Valorization of Steppe Ecosystems (EVES),

*Email: f.bouteldjaoui@univ-djelfa.dz, theldjaoui@yahoo.fr

ABSTRACT

The Ain Oussera plain is located in the central part of northern Algeria between longitudes 2° 15' and 3° 45' E and latitudes 35° and 35° 40' N, and covers approximately an area of 3795 km². The plain has a semi-arid climate type characterized with dry and hot summer and wet and cool winter season. Groundwater investigated in the present study is from the Albian formations which are considered as a major source for drinking and irrigation water. The present study was carried out with the objective to evaluate the groundwater suitability for irrigation purposes using the sodium adsorption ratio (SAR), sodium percentage (%Na), residual sodium carbonate (RSC), the Kelly's ratio (KR), the permeability index (PI), and magnesium hazard (MH). The hydrochemical characteristics of groundwater indicate the order of abundance of the major cations and anions are in the following order: Mg²⁺>Na⁺>Ca²⁺>K⁺ and Cl⁻>SO₄²⁻>HCO₃⁻, respectively. The hydrochemical facies of groundwater was mostly Ca-Mg-Cl-SO₄ type. The US salinity diagram shows that 74% of the groundwater samples fall into C3-S1 and C4-S2 categories for irrigation, which need adequate drainage to overcome salinity problems for irrigational purposes. The permeability index indicates that 89 % of the groundwater samples are good for irrigation uses in the study area. Further, the value of RSC is negative at all sampling sites, indicating that there is no complete precipitation of calcium and magnesium. High salinity, %Na, RSC, and Mg hazard values at some locations limit the use of groundwater for agricultural activities.

Keywords: groundwater; irrigation water quality indices, Geographic information system (GIS), Ain Oussera.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Frequency analysis of precipitation: Case of the Djelfa station

Omar Elahcene¹, Zohir Boulkenafet¹, Aziouz Aidoud², Samira Khadri¹, Hoda Abd El-Azim³, Fekry A. Mourad³, Dalila Chelghoum¹, Hanane Ben Houra¹

¹Université Ziane Achour, Djelfa, Algérie. E-mail : o.elahcene@univ-djelfa.dz

²Université M'Hamed Bougara, Boumerdès, Algérie

National institute of Oceanography and fishiries, NIOF; Cairo, Egypt

ABSTRACT

The estimation of precipitation statistics is a vast field that poses many challenges to meteorologists and hydrologists. Sometimes it is necessary, even essential, to approach extreme events in value for sites where there is little or no data, as well as their return periods. The search for a frequency model of daily rainfall heights is of great importance in operational hydrology: it constitutes the basis for calculating the design flood associated with a given probability of occurrence, once the quantiles have been determined.

The best known and most common approach is the statistical approach. It consists of searching for a probability law that best fits the observed values of the random variable "maximum daily rainfall" after comparing two probability laws. Therefore, a frequency analysis of annual series of maximum daily rainfall was carried out on the data from the Djelfa rainfall station. The period chosen is from 1985 to 2016. It was used to predict quantiles. The laws used are: Gumbel's law graphically and the law of moments. The statistical laws used showed a good fit to the series of maximum daily rainfall for the Djelfa station.

Keywords: Precipitation, statistical distribution, extreme values, Djelfa, Algeria.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Qualitative management of groundwater in steppe areas: Case of the Mio-Plio-Quaternary Aquifer in the Djelfa Syncline (Algeria)

Kaddour HENNIA¹, Abdelkader BOUDERBALA¹

¹Faculty of Natural and Life Sciences and Earth Sciences, Department of Earth Sciences, University of Khemis Miliana, Ain Defla, Algeria
k.hennia@univ-dbkm.dz (Corresponding author)

ABSTRACT

The study area (Djelfa syncline) is part of the Zahrez basin, located in a steppic area between two large structures oriented North-East/South-West: the Atlas Tellian to the north and the Atlas Saharan to the south. It consists of two sub-basins, the Zahrez Rharbi in the West and the Zahrez Chergui in the East. The hydrogeological basin covers an area of about 500 km².

Groundwater in the study area is the main source of the drinking water supply and for industrial and agricultural activities, which strongly influences socio-economic development. Effective qualitative management of groundwater in this region requires comprehensive knowledge of geological, hydrogeological, hydrochemical, and climatic data to evaluate its quality and determine its origin, distinguishing parameters from anthropogenic sources.

To better understand the mechanisms affecting the quality of this aquifer system, a multidisciplinary approach was adopted. Groundwater characterization was performed by combining hydrogeological and hydrochemical information (conventional graphical methods: Piper, Gibbs, Chadha, Durov), multivariate statistical methods (PCA and CHA), and the assessment of the physicochemical quality of groundwater using the Water Quality Index (WQI) and the suitability of this water for irrigation based on parametric indices (SAR and % Na).

The hydrochemical approach, based on the results of analysis of 20 groundwater samples from the low water period in 2022, allowed for the determination of the most dominant chemical facies (chloride and calcium-magnesium sulfate) according to the Piper and Chadha diagrams. These results indicate that water-rock interaction and evaporitic processes are the major geochemical processes controlling groundwater mineralization, as shown by the Gibbs and Durov diagrams. Finally, the study of water quality for human consumption shows the presence of three quality groups: good, acceptable, and poor. Regarding the suitability of groundwater for irrigation of agricultural land, the majority of water points are of acceptable quality for irrigation, with some exceptions.

Keywords: Groundwater, Mio-Plio-Quaternary Aquifer, Djelfa Syncline, Quantitative Management, Water Quality Index (WQI).

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Numerical Simulation of unsteady flow using Explicit Finite-Difference Method

HOCINE Lahouaria, IKNI Taha, BERREKSI Ali, HAMCHAOU Samir, GOUFFI Samira, MERAH Ferhat

Laboratory of Applied Hydraulics and Environment (LRHAE). University of Bejaia, Faculty of Technology,
Department of Hydraulics, Research. Targa Ouzemour, 06000, Bejaia, Algeria.

hocine.lahouaria@univ-bejaia.dz , taha.ikni@univ-bejaia.dz , ali.berreksi@univ-bejaia.dz,
samir.hamchaoui@univ-bejaia.dz, samira.ghouffi@univ-bejaia.dz, ferhat.merah@univ-bejaia.dz,

ABSTRACT

Dams are critical infrastructure for water management, serving essential purposes such as flood control, hydropower generation, and water supply. However, the failure of a dam can lead to catastrophic flooding for downstream communities due to the sudden release of a large volume of water.

Flood waves resulting from dam break events exhibit complex and unsteady flow dynamics. In this study, a numerical method based on an explicit finite-difference numerical scheme is utilized to simulate this behavior by solving The Saint-Venant equations system that govern fluid flow in open channels.

A new mathematical reformulation of the flux term within these equations represents a significant advancement in this research. This reformulation enhances stability and precision in numerical solutions, especially when dealing with shock waves and rapidly changing flow conditions. The validation process involves comparing the results obtained using the new method with analytical solutions, numerical results from other researchers, and experimental data. The validation demonstrates strong agreement between the new method and these benchmarks, indicating high accuracy, convergence rates, and computational efficiency in the simulation results.

Keywords: Open-Channel Flow, Dam Break, Flood Waves, Shallow Water Equations, Finite-Difference Method, Experimental Data.



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Study of the effect of irrigation on the characteristics of steppe soils “Case of the irrigated perimeter of Zraguet, wilaya of Saida”

Yahia BOUKHARI¹, Lame BOURAHLA²

¹Laboratory of Geomatics, Ecology and Environment, Faculty of Nature and Life Sciences, Mustapha Stambouli, University of Mascara. (Algeria).

²Laboratory for Sustainable Management of Bio-Resources in Arid and Semi-Arid Areas, Salhi Ahmed, Naâma University Center. (Algeria).
yahia.boukhari@univ-mascara.dz

ABSTRACT

The combined effects of increasing anthropogenic pressure on natural resources and severe climatic conditions are causing dysfunctions in the steppe space, which is weakened. Like other steppe regions of Algeria, the Saïda region is experiencing anarchic use, leading to a rapid and alarming process of degradation. This process, under the double effect, on the one hand anthropogenic action which will intensify the degradation of vegetation and the erosion of plant biodiversity.

The impact of farming methods in these areas, especially irrigation in the Zraguet perimeter, has led to direct effects on the edaphic characteristics of this area, in particular the salinity of the soil which experienced a significant increase during an average irrigation duration of five years. This increase could have alarming values, up to 3mmhos/cm at 25°C, if the management of irrigations will be carried out in an anarchic way.

In the second study area "Maâmora", the natural evolution of the steppe ecosystem has shown that we can benefit from a plant cover, which can reach 20% and consequently a significant aerial phytomass, providing acceptable fodder units for grazing existing livestock in the Saida region.

Judicious maintenance and leaving room for a natural evolution of our steppe spaces will undoubtedly give more advantages than introducing cultural methods not previously studied.

Keywords: steppe, soil, vegetation, irrigation, Saïda, Algeria.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Identification of Potential Groundwater Storage and Recharge Zones Using GIS, Remote Sensing, and AHP: A Case Study of the Chetma Plain, Southeast Algeria

TABJOUNE Ayoub¹, BOUZNAD Imad Eddine², ZEDDOURI Aziez¹, BELKSIR Mohamed Salah¹

¹Laboratoire des réservoirs souterrains : pétroliers, gaziers et aquifères, Université Kasdi Merbah Ouargla, Route de Ghardaïa BP. 511, 30000 Ouargla, Algérie.

²Université 08 mai 1945 Guelma, Faculté sciences de la nature et de la vie et Science de la Terre de l'Univers.
ayoubtabdjoune@gmail.com

ABSTRACT

With the rapid population growth and increasing demand for water resources, remote sensing and Geographic Information Systems (GIS) have become crucial tools for water resource analysis and management. The importance of these technologies is particularly highlighted in a recent study conducted in the Biskra region, which aims to address the challenges associated with the sustainable exploitation of groundwater. In this region, groundwater demand is especially high due to rapid demographic growth and increased needs in arid areas, where groundwater serves as the primary source of water.

However, groundwater exploration in Biskra is complicated by major geological challenges, leading to high failure rates in drilled wells. These geological complexities make it difficult to determine appropriate drilling sites, further exacerbating water resource management challenges. Additionally, the high costs of the necessary geophysical studies to locate drilling points increase the difficulties encountered. Therefore, it is crucial to explore more cost-effective and efficient alternatives for obtaining accurate results.

In this context, remote sensing and GIS technologies offer effective solutions for identifying potential groundwater recharge zones. By integrating these technologies, it is possible to obtain precise and comprehensive data on groundwater distribution and determine areas that require enhanced recharge. These methods improve analysis efficiency and enable decision-making based on solid scientific data regarding optimal drilling sites.

Moreover, the study employs the Analytical Hierarchy Process (AHP) to assess data and make decisions based on rigorous scientific criteria. This methodical approach allows for ranking and evaluating different options according to various criteria, thereby improving the quality of decisions related to water resource management.

This study serves as a concrete example of the application of modern technologies to address the challenges associated with water resources. By leveraging advanced digital tools, it is possible to ensure sustainable and effective water resource management, contributing to meeting current and future population needs while preserving natural resources.

Keywords: Hydrogeology, Groundwater, Recharge, Remote Sensing, GIS, AHP.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

ASSESSMENT OF CLIMATE AND LAND USE CHANGES ON GROUNDWATER RESOURCES IN THE OUED RIGH REGION, ALGERIA

Azouz BOUDERBALA^{1*}, Imad Eddine BOUZNAD², Abdelkader BOUDERBALA³, Mohamed Salah BELKSIER⁴, Rabah ZEBSA⁵, Abderahmane Salem HACHI⁶, Djamel BENGUSMIA⁷

¹ Department of Earth Sciences and the Universe, Faculty of Hydrocarbons, Renewable Energies and Earth and Universe Sciences, University Kasdi Merbah of Ouargla, Algeria

² Department of Natural and Life Sciences, Faculty of Natural and Life Sciences and Earth and Universe Sciences, University May 8, 1985 Guelma, Algeria

³ Department of Earth Sciences, University Djilali Bounaama of Khemis Miliana, Algeria

⁴ Department of Earth Science and the Univers, Faculty of Hydrocarbons, Renewable Energy and Earth and Universe Sciences, University Kasdi Merbah of Ouargla, Algeria

⁵ Department of Natural and Life Sciences, University 8 May 1945 -Guelma , Algeria.

⁶ Terrain knowledge

⁷ National Bureau of Studies for Rural Development (BNEDER), Cheraga, Algeria.

* bouderbala.azouz@univ-ouargla.dz

ABSTRACT

Oued Righ is one of the main date-producing regions in Algeria, famous for both the quality and quantity of its production. This area, home to approximately 500,000 inhabitants, hosts 50 palm groves totaling 2 million palm trees. Geographically, the valley is naturally divided into three sectors: Oued Righ South, Oued Righ Centre (the Djamaa region), and Oued Righ North.

Wastewater and irrigation runoff are evacuated through a traditional canal spanning 136 km, ultimately discharging into the depressions of the chott Merouane.

The Land Change Modeler (LCM), integrated into the terrSet software, was employed to analyze land use changes over the period 2000-2020, across various categories. Parameters such as vegetation, urbanization, and surface water were considered to evaluate trends in transitioning from one land use category to another.

The model results revealed significant changes, particularly the expansion of irrigated land, primarily within the oases, as well as increasing urbanization. These changes will increase pressure on water demand, resulting in a decline in the groundwater levels of the Terminal Complex aquifer, coupled with the deterioration of groundwater quality. By utilizing these models, decision-makers and actors can gain a better understanding of change processes and develop policies aimed at mitigating the negative impact of human activities on the environment, across different scales ranging from local to global.

Keywords: Oued Righ, Palm groves, Land use change, Water demand, Groundwater quality, Terminal Complex aquifer.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

THE IDENTIFICATION OF WATER RESOURCES WITH REMOTE SENSING USING MODIS AQUA/TERRA AND SPECTRAL INDICES IN THE ALGERIAN STEPPES

Aicha RAHMOUNI^{1*}, Fadhila TOUHARI¹, and Madjid MEHAIGUENE¹ and Abdelkader DOUAOUI²

¹University of Khemis Miliana, Faculty of sciences of Nature and life and Science of the Earth, Laboratory of Agricultural Production and Sustainable Valorization of the Natural Resources (LAPSVNR), 44225 Khemiss Miliana, Algeria.

²University center of Morsli Abdallah Laboratory of Management and Valorization of Agricultural and Aquatic Ecosystems (LMVAAE) 42000 Tipaza Algeria, Faculty/Institute, University, Country

*E-mail: aicha.rahmouni@univ-dbk.m.dz

ABSTRACT

Co-existing plants may use various sources of water especially in arid regions where the main water sources for vegetation are precipitation, soil water, runoff water and groundwater. Traditional methods of studying plant water sources were difficult, such as root excavation could determine the available water sources but the main water sources cannot be determined, because the existence of roots does not mean that these roots are active in water absorption.

This study aimed to evaluate the potential of remote sensing indices including the modified perpendicular drought index (MPDI) and temperature vegetation dryness index (TVDI) in drought monitoring in the Algerian steppes between 2003 to 2023 and water spectral indices NDWI /MNWI and NDVI.

According to the results, although the MODIS-derived drought indices had different efficiencies at different time scales, they could generally better reflect drought conditions at the yearly scale compared to the monthly scale. At the monthly scale, the PDI, MPDI and TVDI had the greatest correlations with the SPI during the 6-, 9- and 3-month periods ending in January, December until April (0.76, -0.59 and 0.72, respectively) which corresponded plant flowering period of *stipa tenacissima*. Moreover, the high correlations between the MODIS-derived drought indices and water spectral indices data reflected their potential in the mapping of desertification in the study area. Considering the constant performance of the MPDI in different time scales, this index can be used as a suitable alternative to the SPI in agricultural drought mapping and monitoring in arid and semiarid areas. The assessment and management of the soil and water is of great importance for vegetation yield potentials and protection against desertification and wind erosion.

Keywords: Steppes, water resources, spectral indices, MODIS, Algeria.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

CLIMATE CHANGE EFFECT ON WATER RESOURCES MANAGEMENT IN WADI M'ZI WATERSHED (LAGHOUAT)

Haied N.^{1*}, Foufou A.¹, Khadri S.², Azlaoui M.³, Boussaid A.¹, Latifi S.⁴

¹Earth and Universe Sciences Department, Nature and Life Sciences Faculty, Ziane Achour University of Djelfa, Algeria

²Biological Sciences Department, Nature and Life Sciences Faculty, Ziane Achour University of Djelfa, Algeria

³Department of Hydraulic, Faculty of Science and Technology, Ziane Achour University of Djelfa, Algeria

⁴Department of Hydraulic, Faculty of Technology, Badji Mokhtar-Annaba University, Algeria

* n.haied@univ-djelfa.dz

ABSTRACT

Wadi M'Zi watershed, which crosses thirteen municipalities of Laghouat is characterized by a semi-arid climate which tends towards aridity. With water resources estimated at more than 276.63 Hm³ year⁻¹, a mobilizable natural water capital of 181.98 Hm³ year⁻¹ as well as 132.07 Hm³ year⁻¹ can be mobilized and a water demand and future water needs that continues to increase from year to year added to the drought resulting from climate change that has affected Algeria since the 1975s. This study aims to evaluate the impact of climate change on the water resources management in this study area on the basis of projected future meteorological data (precipitation and temperature data) using general circulation models (CMIP Coupled Model Intercomparison Project). Two scenarios have been established for the water resources management based on the (real) reference scenario which presumes a transition to the deficit from 2060, a pessimistic one representing the decrease in water resources of the order of half (50%) and another optimistic one based on the contribution of the purification plants of the order of 33.77 Hm³ year⁻¹. The first demonstrates the progress of the transition towards the deficit of twenty-five-years (2035) compared to the real scenario and the second helps to recalibrate this deficit of ten-year (2045) compared to the pessimistic scenario.

Key words: Laghouat, Wadi M'Zi Watershed, Drought, Climate change, Water resources management, CMIP.



International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

GROUNDWATER RESOURCE MANAGEMENT IN A SEMI-ARID AREA IN ALGERIA: THE CASE OF THE AIN EL IBEL SYNCLINE

Mohamed Azlaoui¹, Salah Karef¹, Nadjib Haied², Atif Fougou², Adel Boussaid²

¹Department of Hydraulic, Ziane Achour-Djelfa University. Djelfa 17000 Algeria.

²Earth & Univers Sciences Departement, Ziane Achour-Djelfa University. Djelfa 17000 Algeria.

m.azlaoui@univ-djelfa.dz

ABSTRACT

The protection and preservation of water resources in arid and semi-arid regions rely on integrated resource management, a promising approach to addressing pollution and scarcity of this essential source of life for humanity on our planet Earth. The region of Djelfa, particularly Ain El Ibel, has insufficient water resources to meet the needs for drinking water, as well as those of agriculture and industry.

This research contributes to the effective management of groundwater from the Barremian aquifer in the Ain El Ibel syncline, using a proportional mathematical model that allows for managing the water potential and preserving its quality. For this purpose, we established a conceptual model using the Processing Modflow software, which has the capability to provide a deterministic and two-dimensional numerical simulation, in both steady and transient states, of the groundwater flow in the aquifer. The main results have enabled a better understanding of the different scenarios of piezometric fluctuations. The predictions indicate that this aquifer is in an alarming state, highlighting the necessity for integrated management of its underground resources to ensure sustainable development.

Keywords:: Water resources; Ain El Ibel syncline ; Barremian ; Groundwater ; Algeria

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

PERFORMANCE INDICATORS WITHIN TREATMENT

KAREF Salah^{1*}, AZLAOUI Mohamed¹, BOUSSAID Khadidja², FODILI Mokhtar³

¹Department of hydraulics, Faculty of science and technology, University of Djelfa, Algeria

²Agropastoralism Research Center, Djelfa, Algeria

³Department of Chemistry, Faculty of Exact Sciences and Computer Science, University of Djelfa, Algeria

* s.karef@uiniv-djelfa.dz

ABSTRACT

In the steppe zone in Algeria, sanitation problems remain a major concern and require significant management through appropriate measures with a view to safeguarding and respecting the environment.: For the control of the sanitation system, the itinerary Wastewater deserves to be diagnosed by prospecting and researching performance indicators which make it possible to identify insufficiencies and propose technical solutions for better wastewater management. For the operation of the network, the targeted performances concern problems linked to rainwater and some which highlight the phenomena of sedimentation - erosion in the network. For the WWTP, we are interested in hydraulic and purification capacity, bacterial metabolism, purification efficiency and energy consumption. The results obtained revealed that parasitic clear water exceedances and high wastewater dilution rates require significant management at the network level, which makes it possible to improve performance and reduce operating costs. So that the nitrates are tempered at the outlet of the Medea WWTP, it is necessary to reduce the daily duration of aeration. The TSS/BOD₅ and TSS/COD ratios are high, reflecting particulate pollution. A quantitative study would be desirable to complete these results, in particular to assess the influence of collection networks on the quality of raw domestic wastewater. The maximum values of electrical energy recorded, causing specific energy consumption of the installation to be exceeded, require a diagnostic analysis to be carried out.

Keywords: Wastewater management, Steppe zone, Sanitation system, Treatment, Ratios, Optimization, Performance indicators.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

Impact of climate change on the biodiversity in an artificial wetland in Laghouat region of south Algeria (El Kheneiga)

Chouarfia Malika¹, Guesmi BOUBAKEUR², Chaibi RACHID¹

¹Département science biologie, faculté de science /Université Ammar Telidji, Laghouat Département science biologie, faculté de science /Université Ammar Telidji, Laghouat

²Zian Achour University of Djelfa-ALGERIA

KAKA9653@gmail.com

ABSTRACT

Wetlands are places of multiples stakes, supporting more than 125,500 freshwater dependent species which widely underwent the destruction by the man and the climate change during the last centuries. Fauna is an essential element in the dynamics and functioning of wetlands. The ecological role and bio indicator status of certain species can indicate the sanitary status of wetlands and helps identifying factors related to the degradation. An inventory of arthropods, birds and the plankton were conducted in an artificial wetland El Kheneiga in south Algeria Laghouat with different techniques (Echantillonnage Freqentiel progressif EFP, Winkler sifting, visual collecting, pitfall trap, aerial traps...). We identified 40 species of arthropod (insects, Butterfly, Bees, Mantis, spiders..), 22 species of birds(Black-winged stilt, Little grepe...) and 19 species of plankton (Spirilune , copepods, Daphnia...)with diversified feeding types(coprophagous, predatory, herbivorous...). Calculation of ecological indexes allowed situating the different populations in their environment. This study explain the relationships between spatiotemporal variation of fauna communities and ecological parameters and provide valuable information for conservation assessment and restoration planning and may efficiently guide the implementation of future management program.

Keywords: Wetlands, Biodiversity, Functioning, Conservation, Laghouat.

International Conference

LAND DEGRADATION AND SUSTAINABLE DEVELOPMENT IN THE STEPPES

NOVEMBER 18-21, 2024 | DJELFA, ALGERIA |

THE ROLE OF ENDOZOOCHRIA IN THE DISPERSION AND REGENERATION OF JUNIPERUS PHOENICEA IN THE CENTRAL SAHARIAN ATLAS –ALGERIA

Ahlem BENABDERRAHMANE^{1*}, Safia BELHADJ², Belkacem DAOUDI³

^{1*}Laboratoire : Exploration et valorisation des écosystèmes steppiques (EVES), Faculté des Sciences de la Nature et de la Vie, Université Ziane Achour, Djelfa, Algeria.

²Faculté des Sciences de la Nature et de la Vie, Université Ziane Achour, Djelfa, Algeria.

³Centre de Recherche en Agropastoralisme (CRAPAST), Djelfa 17000, Algeria

* Email: a.benabderrahmane@univ-djelfa.dz
benabderrahmane.ahlem@yahoo.fr

ABSTRACT

Our study goal is to ascertain the effects of *Juniperus phoenicea* seed passage, through potential frugivores' digestive tubes, on their germination and their dispersion behavior in the central Saharan Atlas of Algeria.

The methodology adopted entails comparing germination findings of ingested seeds of *Juniperus phoenicea* by the frugivores, in this case: Ring Ouzels, Wild Boar, Common Genet, Golden Wolf of Africa, red fox, and Shaw's Jird to those of seeds not ingested.

The 15 batches of *Juniperus phoenicea* seeds that have been selected for germination have been placed in sterile Petri dishes of 09 cm in diameter, at the rate of 20 seeds per box with 03 replications. The boxes have been placed in an incubator set at a temperature of 20 °C. The duration of the experiment has been 30 days during which the moistening and counting of the number of germinated seeds have daily been carried out. One indicator of germination has been the appearance of a 1-mm-long radicle. The following germination expression parameters have been used: Germination rate and germination speed.

The main findings demonstrate that frugivores' ingestion of *Juniperus phoenicea* seeds does not favorably affect their germination rates. Nonetheless, the seeds ingested by Ring Ouzels provide close results to those of the control, which oscillate by 60%. Also, a notable decrease has been recorded in the batches of the wild boar and the carnivores. The five (05) batches of Shaw's Jird, on the other hand, show a low to no germination rate. Furthermore, a significant modification of *Juniperus phoenicea* germination pattern is observed after the ingestion of the seeds; not only delaying the latent germination time by a few days but also slowing down the speed of germination. These alterations are unique to each frugivore and such diversity may have a favorable impact on the effectiveness of *Juniperus phoenicea* dispersal. The frugivores studied are keenly involved in removing the fleshy pulp (depulping) from the seeds of *Juniperus phoenicea* as the main barrier to their germination. Certainly, the frugivores, the object of our studies, do not positively affect the germination rate of *Juniperus phoenicea* but the specific diversity of the consumers of its galbuli as a nutritional source, their modes of exploitation and dissemination contribute to the heterogeneity of the germination characteristics of the seeds which can; thus, diversify the habitats on which the new seedlings settle and conquer the new territories more adequate to global changes.

Keywords: Algeria, Frugivores, Germination, *Juniperus phoenicea*, Seed Ingestion.