1ST LENSES E-DIALOGUE WEBINAR:

ADOPTION OF WATER-ECOSYSTEMS-FOOD-ENERGY NEXUS IN AGRIFOOD SYSTEMS ACROSS THE MEDITERRANEAN BASIN

18 January 2023
h. 10:30 CET

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GA n° [2041] [LENSES] [Call 2020 Section 1 Nexus IA]

Improved adoption of drought and salinity tolerant forages and evaluation of cereal/legume mixtures and monocultures to drought and salinity.

NARC-Pilot
Deir-Alla station
Middle Jordan Valley

Dr. Luna Al-Hadidi
Eng. Rawad Sweidan

المركز الوطني للبحوث الزراعية
National Agricultural Research Center

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Pilot #6
NARC-Jordan

Deir-Alla Research Station-Central Jordan Valley.

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Objective:

- The main objective of conducting this study is to evaluate the cultivation of Alfalfa crop which consumes high amounts of irrigation water. This will be in comparison with the use of crop rotations of both summer and winter crops in terms of water saving, economic and environmental aspects.

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Workplan of the Experiment:

- The study was carried out to measure the impact of irrigation with “mixed water quality” on dry matter production, nutritive value, WUE and interspecies competition of cereal/legume mixtures and monocultures and the quality of the silage produced.
- LENSES will bring innovative solutions combining water use efficiency with NCW resource and food security. Alfalfa, barley and vetch monocultures will be planted in winter season, while, in summer sesbania and sorghum will replace the barley and vetch.
- Soil moisture sensors will be installed within the experiment and the amount of irrigation will be determined using automated irrigation system.
- Irrigation level for all crops will be fixed at 100% of crop water requirements.

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Crops: Winter and summer

Crops		
Winter: Barley Summer: Sesbania	Vetch Sorghum	Alfalfa

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Selection of the experimental site

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Silage making and evaluation :

Activity 1: Silage making

- All plots will be harvested and chopped using drive shaft chopper with chopping rate between 3 – 5 cm. Then each treatment will be mixed separately, and samples will be collected for nutritive value analysis and the chopped crop (treatment) will be compressed using hydraulic compressor in a plastic barrels for silage making.
- Molasses will be added during the compressing process (4% of fresh weight) as a source of fermentable carbohydrate for bacteria.
- After 45 days' samples will be collected from each treatment and analyzed using both proximate analysis and NIR technology.

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- Proximate analysis includes; moisture, ash, crude protein, neutral detergent fiber (NDF), acid detergent fiber (ADF) and ether extract.
- Data were collected from pilot to measure biomass produced for each forage plot to evaluate economic value. Different proportions of intercropped silage were made in plastic barrels to ensile the mixed crop.
- For summer crops, 5 intercropped silages were made based on the proportion of sorghum (Sg) and sesbania (Sb) as follow: 0:100, 25:75, 50:50, 75:25, 100:0 (Sg: Sb)

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Silage Making Process

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Crop-Alfalfa & Sorghum-Analysis: Forage quality

Feed Analysis							
Crop	Moisture	Crude Protein	Crude Fiber	Ether Extract	NDF	ADF	ASH
Sorgham	80.822	11.264	33.446	3.178	63.824	25.542	13.198
Sesbania	65.72	14.722	24.868	8.946	33.86	27.036	6.818
Alfalfa	53.146	17.928	-	-	-	-	-
Silage	Moisture	Crude Protein	Crude Fiber	Ether Extract	NDF	ADF	ASH
Sorgham 100	80.64	11.18	32.95	3.09	63.52	25.25	13.17
Sorgham 75	76.8	11.96	31.28	4.67	56.26	25.89	11.43
Sorgham 50	73.17	12.88	28.91	5.9	48.74	26.09	9.9
Sorgham 25	69.36	13.76	26.94	7.46	41.3	26.61	8.143
Sorgham 0	65.69	14.65	24.56	8.92	33.82	26.98	6.79

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Crop-Alfalfa-Analysis: Ash-End of 2022

Test Name		Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Zn
Unit		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lab. No.	Field No.	Result								
390	Alfalfa cut 1	<0.0012	<0.011	<0.0054	10.6	335	48.0	0.70	<0.013	21.7
391	Alfalfa cut 2	<0.0012	<0.011	<0.0054	7.5	312	62.4	0.90	<0.013	28.7
392	Alfalfa cut 3	<0.0012	<0.011	<0.0054	20.3	314	40.9	0.75	<0.013	31.1
393	Alfalfa cut 4	<0.0012	<0.011	<0.0054	8.5	300	50.9	<0.004	<0.013	29.0
394	Alfalfa cut 5	<0.0012	<0.011	<0.0054	7.8	167	37.6	<0.004	<0.013	20.3

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Soil Chemical Analysis: End of 2022

Lab No.	Location	Depth	Extract		ppm		meq/L						Total cations
			pH	EC(dS/m)	P	K	Ca	Mg	Na	Cl	CO_3	HCO_3	
2022/746	Sorghum	0-15	7.7	8.03	42.6	1000	23.30	25.90	29.67	50.00	0.00	7.00	78.87
2022/747	Sorghum	15-30	7.7	5.23	44.6	1250	14.20	18.90	17.93	32.50	0.00	5.00	51.03
2022/748	Sesbania	0-15	7.4	10.49	18.6	1000	37.90	26.10	39.86	72.50	0.00	9.00	103.86
2022/749	Sesbania	15-30	7.4	6.63	16.2	1000	20.00	21.00	24.80	45.00	0.00	6.00	65.80

Lab No.	Ppm								
	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Zn
2022/746	0.024	0.024	0.026	0.599	0.707	0.342	0.219	0.365	6.85
2022/747	0.016	0.029	0.025	0.741	0.622	0.504	0.281	0.401	7.30
2022/748	0.014	0.009	0.010	0.626	0.572	0.365	0.286	0.306	10.37
2022/749	0.015	0.020	0.017	0.605	0.548	0.449	0.258	0.364	39.35

%			Texture
Clay	Silt	Sand	
53.5	40.5	6.0	Silty clay
45.8	36.9	17.3	Clay
69.3	13.7	17.0	Clay
52.7	27.8	19.5	Clay

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Activity 2: Smallholder farmers' workshop

- Three workshops for smallholder farmers were conducted for 20 participants from which four females forage producers were participated.
- A 2-days training workshop were conducted to share knowledge with farmers at pilot site theoretically and practically.

- **Activity 3: Preparation for winter crops**

  - Barley replaced sesbania and vetch replaced the sorghum to ensure the crop rotation for 2022/20023 winter season, harvest will be in May 2023.

  - The experiment was planted on 17/1/2023.

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Main Findings-On-going

- Silage quality will be evaluated at NARC lab and results will be available by the end of January.
- Water analysis; mixed water from King Talal Dam (KTD) was used for irrigation and salinity quality parameter were range from 2 to 3 dS/m for winter and summer season, respectively.
- Soil analysis; Soil nutritional analysis showed that its of good fertility level but with moderate salinity.
- Sorghum productivity under pilot condition were 125-ton green forage per hectare while Sesbania productivity were 48-ton of green forage per hectare.

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Team Members:

NARC: Jordan

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Animal Production.

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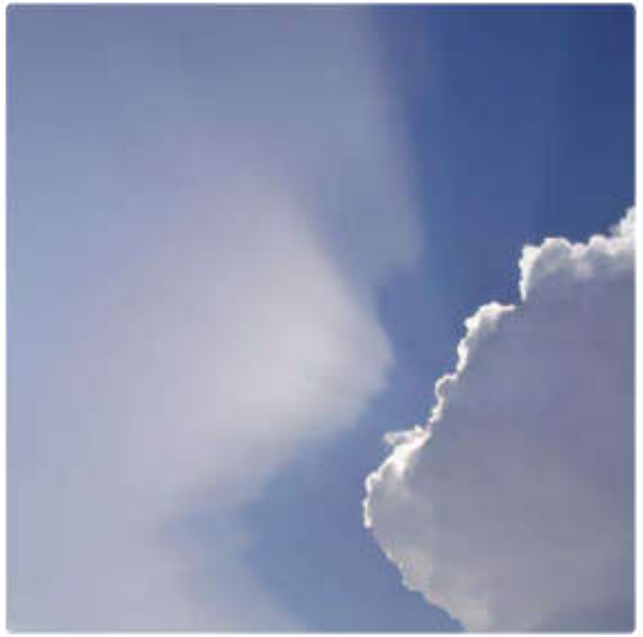
THANKS FOR YOUR ATTENTION!



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Contact(s):

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